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APR 27 1937

# Johns-Manville



**BONDED  
BUILT-UP  
ROOFS**

JOHNS-MANVILLE



FRANKLIN INSTITUTE  
215 N. 4TH ST. PHILA.



**FOR** 79 years, Johns-Manville has been mining and manufacturing products from asbestos, steadily acquiring through those years, a reputation for quality . . . quality based not only upon exceptional facilities for securing the highest grades of raw material . . . as one would expect from the largest asbestos mine in the world . . . but also the quality which results from years of research and experience in fabricating asbestos in its eleven large factories throughout the United States.

For sixty of those 79 years, Johns-Manville has combined the traditions of a great mine with the expert knowledge and skill of a large manufacturer in the making of asbestos roofings, controlling every step from mine to market, to the distinct advantage of every present or prospective user of a Johns-Manville Built-up Roof.

In the pages which follow, are discussed the inherent qualities which make a roof dependable, long-lived and fire-resistant, and the lasting benefits which will accrue from proper materials, properly applied.

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By

Johns-Manville Corporation

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# JOHNS-MANVILLE

## Complete BUILT-UP ROOF SERVICE

Realizing that no one type of built-up roof can be acceptable or usable under all conditions, and recognizing the factor of individual preference, Johns-Manville has developed a number of different types of built-up roofs and is in a position to furnish a roof to meet practically any condition or personal preference.

The various standard J-M Built-Up Roofs are tabulated and a condensed specification given on pages 12 and 13, with ratings of the Underwriters' Laboratories, Inc. They are classified on the basis of quality, the kind and slope of deck, the type of finish, felt, etc. Detailed individual specifications begin on page 14.

### J-M Smooth-Surfaced Asbestos Built-up Roofs

While Johns-Manville furnishes built-up roofs of every type, the smooth-surfaced asbestos roof is recommended as the one best designed to stand up under all conditions and to give complete trouble-free protection for the life of the building.

J-M Smooth-Surfaced Asbestos Built-up Roofs are the outcome of several decades of study and experience in producing durable, fireproof, weatherproof, lightweight roofs at a moderate cost. They are suitable for practically every type of industrial building, warehouse, office building, hotel, hospital and apartment-house.

They are built up of alternating layers of asphalt-saturated asbestos felt and roofing asphalt.

J-M Asbestos Felts, with which J-M Bonded Asbestos Roofs are built up, will not support combustion even when impregnated and coated with asphalt. The Underwriters' Laboratories, Inc., give Class A ratings to many different types of J-M Asbestos Roofs. They are fire-resistant to the highest degree.

J-M Bonded Roofing Asphalt—a relatively recent development in asphalt processing which has proved to be far superior to ordinary asphalts—is used on all J-M Bonded Asbestos Roofs. Tests at the Johns-Manville Research Laboratories at Manville, N. J., have demonstrated that the unusual ability of J-M Bonded Asphalt to stand up under all conditions of service will add years to the life of the roof.

### Additional J-M Bonded Roofs

In addition to asbestos roofs, Johns-Manville also supplies Combination Roofs, composed of a rag base felt and asbestos finishing felts, and a complete line of slag or gravel-surfaced

roofs, using tar-saturated asbestos felts, tar-saturated rag felts, or asphalt-saturated rag felts. These types of J-M Bonded Roofs are also included in the tables on pages 12 and 13.

### Approved Roofing Contractors . . . Inspection . . . Bonds . . . Endorsements

As the best results are obtained only when the proper roofing is correctly laid, Johns-Manville has appointed Approved Roofing Contractors throughout the country, basing these appointments on experience, integrity and financial responsibility.

#### J-M Inspections are Available

Johns-Manville maintains a corps of inspectors whose services are available in connection with bonded built-up roofs. This service is required in connection with every roof which is to be bonded and is rendered before, during and after application.

#### Covered by Bond of National Surety Corp.

All Johns-Manville Built-up Roofs, except on the Pacific Coast, will when desired, be covered by a bond of National Surety Corp., guaranteeing the performance of the particular roof for a period of from ten to twenty years, depending on the type of roof applied. This bond is issued only on roofs laid by Johns-Manville Approved Roofing Contractors and in connection with Johns-Manville inspection service.

#### A Ten-Year Flashing Endorsement

Where Johns-Manville Flashing Materials are used in conjunction with Johns-Manville Roofing, a ten-year flashing endorsement will be attached to and become part of the bond, under the same conditions imposed for the bonding of the roof.



# A Johns-Manville Smooth-Surfaced Asbestos Roof Gives the Best Assurance of Roof Permanence

Since the primary purpose of a roof is permanent protection from the elements, it is obvious that a good roof must not only shed water, it must *stay* waterproof. And, for permanence, it must also be proof against fire and decay.

## THE IMPORTANCE OF THE TYPE OF ASPHALT USED FOR ROOFS

Scientific research has found no waterproofing agent better than asphalt, which has been proved to be less brittle at low temperatures and less fluid at high temperatures than any other known waterproofing material. Yet there are many kinds and grades of asphalt. In the effort to secure the permanence requisite in a good roofing asphalt, J-M research engineers have developed a processed asphalt known as J-M Bonded Roofing Asphalt, which has shown marked superiority over all other asphalts ordinarily used for such purposes.

## TESTS ON J-M BONDED ROOFING ASPHALT

In a series of accelerated tests by machine weathering, the J-M Laboratories subjected samples of Bonded Roofing Asphalt and other commercial asphalts to alternating cycles of exposure to heat, rain and sub-zero temperature, equivalent to ten years of actual service. Although the samples were practically identical in appearance before testing, the illustration at the upper right shows how Bonded Asphalt stood up when the others failed. It is this unusual permanence which led to the adoption of J-M Bonded Roofing Asphalt as the waterproofing agent in J-M Bonded Built-up Roofs.

However, even the best asphalt cannot, alone, make a good roof. There must be a flexible reinforcement, durable and non-combustible, which can itself be impregnated with asphalt to keep it waterproof, and which at the same time will protect the asphalt from its one cause of deterioration — the drying-out action of the sun. Asbestos felt meets these requirements exactly.



### WEATHERING TEST ON ASPHALT

After water spray, arc light and refrigeration, representing rain, heat and cold, were played on these three samples of roofing asphalt for the equivalent of 10 years of actual weathering, J-M Bonded Roofing Asphalt (right) was still apparently good as new

## ASBESTOS USED IN J-M ASBESTOS FELTS

Centuries ago it was found that asbestos fibres could be woven into a fireproof cloth, but only during the past 60 years has it become commercially useful. Today this basic material is used in brake lining for automobiles and trucks because it is the only fibrous material that will not burn or disintegrate under high temperatures. It is used in woven form in asbestos

theater curtains, fire fighting suits, gloves, etc.

In combination with portland cement it is made into rigid asbestos roofing, siding and shingles, corrugated transite for roofing and siding, pipe and underground conduit, electrical barriers, etc. As used in built-up roofing, the asbestos fibres are first felted and then impregnated with asphalt, making a *flexible stone roofing material, imperishable and fireproof.*

### ASBESTOS

Asbestos—fibres of stone—fireproof, rot-proof, enduring—the base of a good built-up roof. Crude asbestos fibres are here shown still attached to the serpentine rock matrix

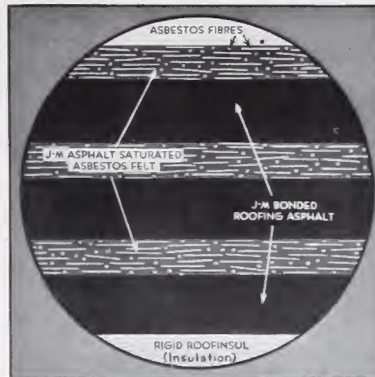


## How the Waterproofing Asphalt is Preserved by Asbestos Felt

The characteristic difference between asbestos fibre and all other natural fibres is that asbestos fibre is a solid filament, not a hollow tube. There can be no capillary action through it. This makes asbestos felt highly difficult to impregnate, since the waterproofing must be forced between and around the fibres, coating them and filling all the interstices, rather than their soaking it up with the blotterlike effect of organic fibres.

But this very lack of capillary action and consequent resistance to impregnation is the source of the protection which asbestos felt affords the vital waterproofing asphalt, once the felt is impregnated with it. The essential oils of the asphalt are protected from evaporation due to the continuous drying-out action of the sun, which so rapidly deteriorates other types of roofing, and the asbestos built-up roof *stays* waterproof. The accompanying diagram of the security afforded by asbestos felt is self-explanatory.

When the asbestos felt has been impregnated with J-M Bonded Roofing Asphalt, and Bonded Roofing Asphalt used as the cementing layer between the plies of felt forming the Built-up roof, the asphalt is preserved in practically its original condition. The result is a smooth-surfaced roof that *stays* waterproof for years, with minimum upkeep.

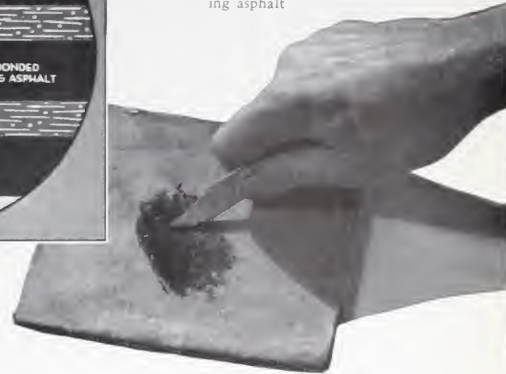


### SHOWN AT RIGHT:

If you scrape the gray surface of an asbestos roof with a pen-knife the black asphalt appears below. You can repeat this test a dozen times in the same spot and will obtain the same results

### SHOWN AT LEFT:

The diagram at left shows a magnified edge of a 3-ply asbestos roof. Notice how the individual fibres of asbestos felt protect the impregnating asphalt from the sun, and how each ply of asbestos roofing felt acts as a protective blanket to the underlying layer of waterproofing asphalt

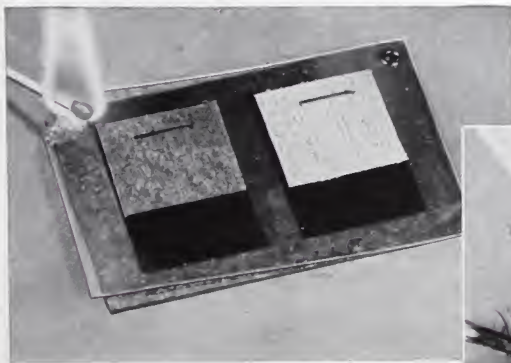


## PROOF AGAINST FIRE AND DECAY

But asbestos does more than merely protect from weather. Asbestos is fire-proof and rot-proof and thus adds the other two essentials to roof permanence. Its very existence—in the oldest igneous rocks—proves its endurance against the destructive forces of fire, time and the elements.

Asbestos felt is virtually felted fibres of stone. It cannot decay; it will not burn. Exhaustive tests by the Underwriters' Laboratories, which included exposure to radiant heat, burning brands and direct flame, have proved that asbestos felt, even when impregnated and coated with asphalt as used in a J-M Built-Up Roof, will not support combustion. J-M Asbestos Roofs are so fire-resistant that, in every type, there will be found roofs that carry the Underwriters' Class A rating, which takes the base rate of insurance.

## How Asbestos Felt Resists Fire



You can make this experiment in your own office with a J-M Roofing "Sandwich." This consists of pieces of J-M Asbestos Felt and rag felts stapled between sheets of a highly inflammable material. Lay the "sandwich" on a fireproof surface and light it. Instantly it bursts into flame. In a few seconds it goes out—yet in that time the organic rag felt is reduced to ashes, while the enduring mineral J-M Asbestos Felt remains, slightly sooty perhaps, but unharmed. A "sandwich" for this test will be promptly sent on request.

SEE FOR YOURSELF  
MAKE THIS EASY TEST  
RIGHT IN YOUR OWN OFFICE



## 9 Advantages of a J-M Smooth Surfaced Asbestos Roof

### 1 PROVEN BY TEST OF TIME

The lasting qualities of a Johns-Manville Smooth Surfaced Asbestos Roof are clearly demonstrated on pages 8 and 9 in which are listed actual installations of this type of roof which have withstood the elements for 20 years or more.

### 2 CAN BE APPLIED TO EVERY ROOF WHICH WILL DRAIN WATER

We do not recommend the use of dead level roof decks. Roof decks should be graded to proper drains to prevent possibility of areas which will not drain. Undrained spots become unhealthy and breeding grounds for mosquitoes as well as creating unequal exposures of different parts of the roof surface to the elements. This creates the likelihood of unequal strains developing in the surface due to difference of exposure.

### 3 NO PROTECTIVE COVERING IS NEEDED; MATERIALS PROTECTED FROM SUN

Asbestos Roofing Felts do not require the use of slag or gravel for the protection of the asphalt and the felts. The asbestos in the felt prevents the sun from causing the deterioration or drying out of the asphalt in and between the felts.

### 4 HIGHLY FIRE-RESISTANT

The J-M 20-Year Smooth Surfaced Asbestos Roof is given a Class A rating, and the similar J-M 15-Year Roof a Class B rating, by the National Board of Fire Underwriters.

### 5 DECAY-PROOF

Asbestos felts, being made from rock fibre and asphalt, will not decay. The roof built up from these felts and asphalts will withstand the heat and cold and constant action of the elements under all kinds of conditions.

### 6 LEAKS EASILY LOCATED

An unforeseen accident or unusual expansion and contraction of the roof deck may damage any roof surface and cause it to leak. With a J-M Smooth-Surfaced Asbestos Roof, any such damaged areas can be quickly located.

### 7 EASY TO REPAIR

The construction of Smooth Surfaced Asbestos Roofs is such that repairs can be made quickly and inexpensively.

### 8 NO EXCESSIVE WEIGHT

The smooth surfaced asbestos felt roof finish does not require the protection of slag or gravel, therefore saving in the construction necessary to support the weight of such materials.

### 9 FIRST COST IS LAST COST FOR J-M WATERPROOFING MATERIALS

Nothing is added to the roof construction which is not a waterproofing in itself.



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# The Critical Part of a Roof is the Flashing . . .

## FLASHING IS WHERE LEAKS ARE MOST LIKELY TO OCCUR

More than at any other place on a roof, a leak is apt to occur at the junction formed by the roof deck and a vertical surface such as a parapet wall, skylight curb or wall of an adjacent building, etc. Most roof decks are separate units from these vertical surfaces and oftentimes are constructed of different materials. There is a natural weakness at the angle due to shrinkage of the material, expansion or contraction, or other movement of the building.

In addition to this it must be remembered that a parapet wall stands up above the roof where driving rain beats against it from both sides as well as the top. Consequently, the wall absorbs a certain amount of moisture. For this reason it is most desirable that the flashing should go all the way through the wall. This method isolates the roof deck and keeps water from seeping down through the wall and under the roofing.

## THE ROOF AND THE FLASHING SHOULD BE TWO DISTINCT OPERATIONS

Johns-Manville has designed several types of flashing so that any of the different conditions encountered on a roof can be handled successfully. In designing these flashings we have definitely made the roofing and the flashing two separate operations. The laying of the roofing felts should be completed before applying the flashing. Before any work is done a "cantstrip" or "V" shaped piece of lumber or other nailing base is installed at the angle formed by the roof and the vertical surface, so that instead of a sharp angle there is formed a gradual slope.

## J-M FLASHING BECOMES A PART OF THE WALL

Johns-Manville asbestos flashing felts are made up of the same basic materials as the asbestos roofing felts. The waterproofing or cementing agent is Johns-Manville Ready Mixed Asbestile, a heavy bodied plastic cement composed of asbestos fibres, asphalt and other mineral ingredients, which hardens and becomes a part of the wall itself.

## "THROUGH-THE-WALL" FLASHING PROVIDES GREATER PROTECTION THAN ANY OTHER KIND

A Johns-Manville Asbestos Flashing Felt is first applied to the wall with asphalt and turned out over the finished roof to form the *base* flashing. This felt must be nailed to the wall. The edge of the flashing felt *on the roof* is then reinforced with felt strips. The *cap* flashing is then installed. This consists of running one asbestos felt and one ply of saturated fabric from a point one inch back from the front face of the wall, through the wall, over a key, and then extending down the wall, lapping the top of the base felt, all applied with Asbestile. This forms a complete seal for the roof structure.



More leaks occur at the flashing than at any other part of a roof. THROUGH THE WALL FLASHING is the safest known method of providing a permanently weather-tight job at this vulnerable point.

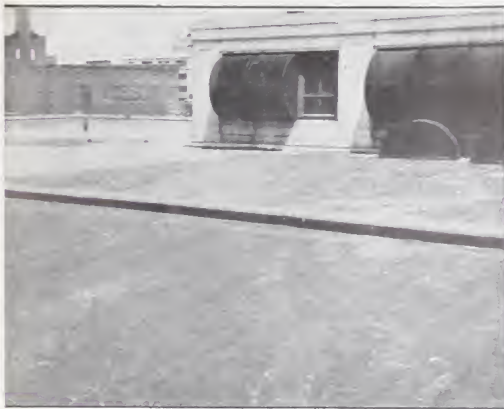
## VARIATIONS OF "THROUGH-THE-WALL" FLASHING METHOD

Naturally, there must be variations of this "through-the-wall" method of flashing in order to take care of different methods of construction and different materials. In the case of a concrete parapet wall where it is impossible to go through the wall itself, the cap flashing is carried up over the concrete wall and under the coping. In cases where metal cap flashing is used the Johns-Manville base flashing is installed as described above and the metal cap flashing should go through the wall for adequate protection.

## IMPORTANCE OF FLASHING EMPHASIZES NEED FOR COMPETENT APPLICATION

It is obvious that inferior or short-cut methods of flashing will weaken the entire roof from a waterproofing standpoint. This is another reason why such care is taken in selecting Johns-Manville Approved Roofing Contractors. They will apply the flashings in accordance with Johns-Manville recommendations, assuring leak-proof, fireproof roofs at every point.

Detailed specifications and drawings on the Johns-Manville System of Flashing will be found on pages 53 to 55.



**A 25 YEAR OLD AT KANSAS CITY, MO.**

In 1912 this J-M roof was applied on the building of the Kansas City Star. Says the owner, "Certain portions are subjected to foot traffic but it has given excellent service with practically no cost for repairs or maintenance."



**A 24 YEAR OLD AT CHICAGO, ILL.**

This J-M asbestos roof was laid in 1913 for Reid, Murdock & Company, 325 No. LaSalle St. The roof has given very satisfactory service.



**A 25 YEAR OLD AT SOUTH BEND, IND.**

This J-M smooth-surfaced asbestos roof has been protecting the Oliver Farm Equipment Company factory for a full quarter of a century.

8

The performance of Johns-Manville Smooth-surfaced Asbestos Built-up Roofs is a record of which to be proud. Here are photographs which were taken in 1935 of a few of such roofs . . . every one of which has had a service life of 20 years or longer . . . and all are still in good condition.

Note the pleasing gray appearance of the roofs. As has been explained on page 5, this gray surface is the top-most layer of the asbestos fibres in the asbestos felt which blankets the vital waterproofing asphalt and protects it from the deteriorating action of the sun.

In addition to the roofs illustrated, among the many other Johns-Manville roofs with service records of 20 years or more, are the following typical examples:

## A 36 YEAR OLD

**At Newark, N. J.**

Building No. 4 of General Leather Company. Says Chief Engineer Krill, "During that entire period it has not required any maintenance whatever."

## THREE 25 YEAR OLDS

**At Seattle, Wash.**

J-M Smooth-surfaced Asbestos Roof was applied for the O.W.R.R. & N. Co., Argo Machine Shop, in September, 1912. Still in splendid condition.

**At Detroit, Mich.**

Detroit Baseball Company reports, "Your asbestos roofs were installed in 1912 on right and left field pavilions at Navin Park. They have withstood weather and the added punishment of thousands of baseballs striking them. The material appears in good condition."

**At Louisville, Ky.**

American Medicinal Spirits Company writes, "The performance more than speaks for itself."

## BELOW . . . A 20 YEAR OLD AT WATERTOWN, N. Y.

Bagley and Sewall Company report that their J-M smooth-surfaced asbestos roofs appear to be in condition to last many years longer.



**FOUR 24**  
**At Seattle**

The roof of good condition

**At Bluefield**

Huff. And roof. "Except last winter, it has been reduced service on

**At Chicago**

Sears. Roeb. old J-M asbest

**At Los Ang**

Agent for E have probably applied in 191

**TWO 23**  
**At Seattle**

The world v on the Lincoln splendid shape

**At Los Ang**

New Metho tunous service

**IN CIRCLE**

On March 4, Hauser Packing

**BELOW — A**

"Nearly a qua Company of the

## 20 Years Old, Still in Their Prime

### FOUR 24 YEAR OLDS

#### At Seattle, Wash.

The roof of the Bell Street Dock, Port of Seattle, is still in good condition, although it was applied as long ago as 1913.

#### At Bluefield, W. Va.

Huff, Andrews and Thomas Company writes about their J-M roof, "Except for some shovel cuts caused by the removal of snow last winter, it is in excellent condition. . . . Overhead expense has been reduced to a minimum. . . . Anticipate many more years of service on this roof."

#### At Chicago, Ill.

Sears, Roebuck & Co. (Grocery Building) report two 24-year old J-M asbestos roofs "in good condition."

#### At Los Angeles, Cal.

Agent for Brockman Building reports "repairs to J-M roofs have probably not exceeded \$10 during all this time." Roof applied in 1913.

### TWO 23 YEAR OLDS

#### At Seattle, Wash.

The world war had just started when a J-M roof was applied on the Lincoln High School in Seattle. The asbestos felts are in splendid shape today.

#### At Los Angeles, Cal.

New Method Laundry states their J-M roof "has given continuous service and is still in excellent condition."

#### IN CIRCLE — A 21 YEAR OLD AT LOS ANGELES, CAL.

On March 4, 1915, this J-M roof was laid on the warehouse of the Hauser Packing Company. "Good for many more years of service."

#### BELOW — A 24 YEAR OLD AT CINCINNATI, OHIO

"Nearly a quarter of a century," says the American Valve and Metal Company of their J-M smooth surfaced asbestos roof.

#### A 27 YEAR OLD AT BEACH GROVE, IND.

In 1910 the Big Four Railroad bought a J-M smooth surfaced asbestos roof for their Coach Shop. The photograph shows that it is still in good condition and will undoubtedly give many more years of satisfactory service.

#### A 24 YEAR OLD AT DETROIT, MICH.

In 1913 J-M asbestos roof was laid for the Enterprise Foundry Company. And now they state, "This roof looks good for many more years."



#### A 20 YEAR OLD AT SEATTLE, WASH.

Meyer Mill, University of Washington is protected by this J-M smooth surfaced asbestos roof. In good condition after 20 years.

## 6 Good Reasons for a Johns-Manville

Rigid Roof

ONE  
Prevents

J-M Rigid Roofinsul in three 1/2" layers. Roof insulation not only saves fuel and assures comfortable interior temperatures, but also protects both the roof deck and the built-up roof itself.

Regarding the underside of the roof, the removal of vapor in the face as condensation keeps the temperature of the roof remains.

When a roof is insulated, the underside of the roof is protected from the temperature of the vapor in the face as condensation keeps the temperature of the roof remains.

TWO  
Protects

By preventing the deck from cracking or other changes) and the reinforcement.

THREE  
Prevents Deck Movement

Rigid Roof

DECAY FROM MOISTURE CONDENSATION  
Moisture condensation is the result of the removal of vapor in the face as condensation keeps the temperature of the roof remains.



### APPLYING RIGID ROOFINSUL

Applying J-M Rigid Roofinsul in three 1/2" layers. Roof insulation not only saves fuel and assures comfortable interior temperatures, but also protects both the roof deck and the built-up roof itself.

## Johns-Manville Rigid Roofinsul

### Light in Weight — High in Insulating Value

J-M Rigid Roofinsul was designed especially for use as insulation over roof decks, principally under J-M Bonded Asbestos Built-up Roofs. It is light in weight and has a high insulating value, and is also rigid and structurally strong. J-M Rigid Roofinsul has a high resistance to moisture absorption. It lasts for years in the open and, when covered with a J-M Bonded Asbestos Roof, will last as long as the roof itself.

Any desired number of layers of J-M Rigid Roofinsul can

be installed to give any needed insulating efficiency, without adding appreciably to the weight of the roof.

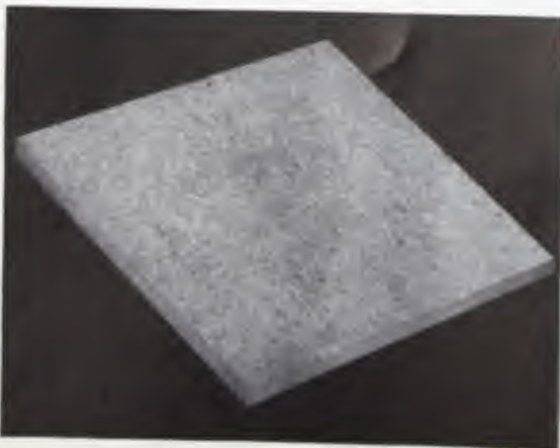
J-M Rigid Roofinsul is furnished 24" x 48". The standard thickness is 1/2". If sheets of greater thickness than 1/2" are desired, two or more sheets are stapled together with a 3/4" ship-lap joint on all four edges. Weight approximately 0.8 lb. per sq. ft., 1/2" thick.

### HEAT LOSSES IN ROOF CONSTRUCTION FOR INSULATED AND UNINSULATED ROOFS

Type of Roof	Thickness of J-M Rigid Roofinsul	Heat Loss in B.t.u. per sq. ft., per deg. F. temperature difference per hour
7/8" wood deck and smooth-surfaced built-up roof	None	.533
	1/2"	.296
	1"	.205
	1 1/2"	.157
1 3/8" wood deck and smooth-surfaced built-up roof	None	.381
	1/4"	.242
	1"	.178
	1 1/2"	.140
4" concrete and smooth-surfaced built-up roof	None	.676
	1/2"	.336
	1"	.223
	1 1/2"	.167
5" concrete and smooth-surfaced built-up roof	None	.625
	1/2"	.323
	1"	.217
	1 1/2"	.164
	2"	.132

### EFFICIENT, STRONG J-M RIGID ROOFINSUL

Especially designed for insulating roofs of industrial, commercial and institutional buildings.



# Rigid Roofinsul • Insulated Roof

## ONE

### Prevents Condensation and Roof Drip

J-M Rigid Roofinsul prevents condensation on the under side of the deck and eliminates discoloration of ceilings and the annoyance and damage caused by roof drip.

Regardless of how carefully a wood deck may be constructed, vapors penetrate the planking, condense on the underside of the built-up roof and rot starts at the top, unseen, and works down. While the problem of rot can be eliminated by the use of concrete, that of condensation and roof-drip remains.

When air comes in contact with a cooler surface, such as the underside of a roof, its temperature is lowered. If the temperature of the surface is below the dew point of the water vapor in the air, the excess moisture is deposited on the surface as condensation. Insulation of the proper thickness will keep the temperature of the surface above the dew point and prevent the deposition of moisture.

## TWO

### Protects Deck Against Rot and Corrosion

By preventing condensation, J-M Rigid Roofinsul protects the deck against rot and corrosion. When the deck is of concrete or other non-combustible material, it reduces the danger of cracking (commonly caused by sudden temperature changes) and thereby tends to prevent moisture from reaching the reinforcing steel members.

## THREE

### Prevents Damage to Roofing Felts Through Deck Movement

Rigid Roofinsul protects the roofing felts themselves. All

roof decks move to some extent under temperature changes. When this cycle of alternate expansion and contraction continues over a long period of time, any cracks in the deck may eventually be transmitted to the built-up roof unless there is an intervening layer of insulation. J-M Rigid Roofinsul not only minimizes movement of the deck by keeping its temperature more uniform, but also provides sufficient resiliency to take up strains due to any movement which does occur and prevent their transmission to the felts, thus prolonging the life of the roof.

## FOUR

### Provides Closer Interior Temperature Control

Roofinsul permits closer control over interior temperatures both in summer and winter, assuring more comfortable, uniform working conditions throughout the year. Uniform interior temperatures are also a vital necessity in the operation of many modern industrial processes.

## FIVE

### Improves Working Conditions

Insulation with Roofinsul effectively retards the passage of heat through the roofs, thus saving on fuel and air conditioning bills. See table on opposite page.

## SIX

### Lowers Heating and Air Conditioning Costs

On new construction, J-M Rigid Roofinsul makes it possible to reduce considerably the investment in heating and air conditioning equipment. And on either new or old buildings, it appreciably lowers operating costs on such equipment.

#### DECAY FROM MOISTURE CONDENSATION

Moisture condensation and the resultant decay made the removal of these old wood decks imperative. J-M Rigid Roofinsul would have prevented this expense



# Index and Condensed Specifications on

Johns-Mc

Specification Number	Page No.	Pitch of Roof per Foot, in Inches	Bond, Years (See Note)	Underwriters' Classification	Surface	Number of Plies and Kind of Felt	Number of Mappings Asphalt (A) or Pitch (P)	Weight of Materials, in Pounds per Square								Total Weight per Square, in Pounds		
								Sheathing Paper	Felts		Asphalt	Pitch	Roof Coating	Gravel	Slag	Smooth Surface or Crushed Slate	Gravel Surface	Slag Surface
Asbestos	Rag																	
WOOD DECKS																		
Smooth Surface																		
100	14	¼ to 9	20	A	Smooth	One 55-lb. Asphalt-Saturated Asbestos Felt Three 20-lb. Asphalt-Saturated Asbestos Felt	A-3	—	115	—	90	—	8	—	—	213	—	—
103	14	¼ to 9	15	A	Smooth	One 55-lb. Asphalt-Saturated Asbestos Felt Two 20-lb. Asphalt-Saturated Asbestos Felt	A-2	—	95	—	60	—	8	—	—	163	—	—
200	15	¼ to 9	15	—	Smooth	One No. 45 Asphalt-Saturated Rag Felt Two 20-lb. Asphalt-Saturated Asbestos Felt	A-2	—	40	50	60	—	8	—	—	158	—	—
202	15	¼ to 9	10	—	Smooth	One No. 30 Asphalt-Saturated Rag Felt Two 20-lb. Asphalt-Saturated Asbestos Felt	A-2	—	40	30	60	—	8	—	—	141½	—	—
205	△	¼ to 9	20	—	Smooth	One No. 45 Asphalt-Saturated Rag Felt Three 20-lb. Asphalt-Saturated Asbestos Felt	A-3	—	60	50	90	—	8	—	—	208	—	—
Gravel or Slag Surface																		
300	16	¼ to 2	20	A	Gravel or Slag	Five 15-lb. Asphalt-Saturated Rag Felts	A-4	—	—	81	145	—	—	400	300	—	626	526
304	16	¼ to 2	15	A	Gravel or Slag	Four 15-lb. Asphalt-Saturated Rag Felts	A-3	—	—	65	115	—	—	400	300	—	580	480
301	17	2 to 4	10	A*	Slag	Five 15-lb. Asphalt-Saturated Rag Felts	A-5	—	—	81	150	—	—	—	250	—	—	481
600	**17	¼ to 2	20	A	Gravel or Slag§	One ply Rosin-Sized Paper (over wood only) Five 15-lb. Tar-Saturated Asbestos Felt	P-4	5	—	81	—	150	—	400	300	—	636	536
604	**18	¼ to 2	15	A	Gravel or Slag	One ply Rosin-Sized Paper (over wood only) Four 15-lb. Tar-Saturated Asbestos Felt	P-3	5	—	65	—	125	—	400	300	—	595	495
601	**18	2 to 6	10	A*	Slag	One ply Rosin-Sized Paper (over wood only) Five 15-lb. Tar-Saturated Asbestos Felt	P-4 A-1	5	—	81	45	60	—	—	250	—	—	441
Crushed Slate Surface																		
402	△	1 to 4	10	C	Crushed Slate	Three 15-lb. Asphalt-Saturated Rag Felts Two 50-lb. Asphalt-Saturated Slatekote Felt	A-4	—	—	149	120	—	—	—	—	269	—	—
400	△	4 to 9	10	C	Crushed Slate	Two 15-lb. Asphalt-Saturated Rag Felts Two 50-lb. Asphalt-Saturated Slatekote Felt	A-2	—	—	133	60	—	—	—	—	193	—	—
WOOD DECKS WITH RIGID INSULATION																		
Smooth Surface																		
104	19	¼ to 9	20	A	Smooth	Four 20-lb. Asphalt-Saturated Asbestos Felt	A-4	—	80	—	120	—	8	—	—	208	—	—
106	19	¼ to 9	15	B	Smooth	Three 20-lb. Asphalt-Saturated Asbestos Felt	A-3	—	60	—	90	—	8	—	—	158	—	—
Gravel or Slag Surface																		
606	**20	¼ to 2	20	A	Gravel or Slag	Four 15-lb. Tar-Saturated Asbestos Felt	P-5	—	65	—	—	175	—	400	300	—	640	540
608	**21	¼ to 2	15	B	Gravel or Slag	Three 15-lb. Tar-Saturated Asbestos Felt	P-4	—	49	—	—	160	—	400	300	—	599	499
610	**21	2 to 6	10	A*	Slag	Four 15-lb. Tar-Saturated Asbestos Felt	P-3 A-1	—	65	—	45	105	—	—	250	—	—	465
PRE-CAST GYPSUM DECKS																		
Gravel or Slag Surface																		
300	16	¼ to 2	20	A	Gravel or Slag	Five 15-lb. Asphalt-Saturated Rag Felts	A-4	—	—	81	145	—	—	400	300	—	626	526
304	16	¼ to 2	15	A	Gravel or Slag	Four 15-lb. Asphalt-Saturated Rag Felts	A-3	—	—	65	115	—	—	400	300	—	580	480
301	17	2 to 4	10	A*	Slag	Five 15-lb. Asphalt-Saturated Rag Felts	A-5	—	—	81	150	—	—	—	250	—	—	481
600	**17	¼ to 2	20	A	Gravel or Slag	Five 15-lb. Tar-Saturated Asbestos Felt	P-4	—	—	81	—	150	—	400	300	—	631	531
604	**18	¼ to 2	15	A	Gravel or Slag	Four 15-lb. Tar-Saturated Asbestos Felt	P-3	—	—	65	—	125	—	400	300	—	590	490
601	**18	2 to 6	10	A*	Slag	Five 15-lb. Tar-Saturated Asbestos Felt	P-4 A-1	—	—	81	45	60	—	—	250	—	—	436
PRE-CAST GYPSUM DECKS WITH RIGID INSULATION																		
Gravel or Slag Surface																		
606	**20	¼ to 2	20	A	Gravel or Slag	Four 15-lb. Tar-Saturated Asbestos Felt	P-5	—	65	—	—	175	—	400	300	—	640	540
608	**21	¼ to 2	15	B	Gravel or Slag	Three 15-lb. Tar-Saturated Asbestos Felt	P-4	—	49	—	—	150	—	400	300	—	599	499
610	**21	2 to 6	10	A*	Slag	Four 15-lb. Tar-Saturated Asbestos Felt	P-3 A-1	—	65	—	45	105	—	—	250	—	—	465
△ Complete specification not included in this Catalog but will be furnished on request. * Class A Underwriters' Ratings on Pitches up to and including 3" per foot. § This specification adapted for use under Promenade Tile. Note: No bonds issued on Pacific Coast																		
** Available also, employing "Rag" felt instead of "Asbestos" felt. See note appended to the specification on page number indicated.																		

△ Complete specification not included in this Catalog but will be furnished on request.  
 \* Class A Underwriters' Ratings on Pitches up to and including 3" per foot.  
 § This specification adapted for use under Promenade Tile.  
 Note: No bonds issued on Pacific Coast

\*\* Available also, employing "Rag" felt instead of "Asbestos" felt. See note appended to the specification on page number indicated.

\* Class A Underwriters' Ratings on Pitches up to and including 3" per foot.  
 † 1½" to 2" over P.  
 ‡ 2" to 6" over P.  
 Note: No bonds issued

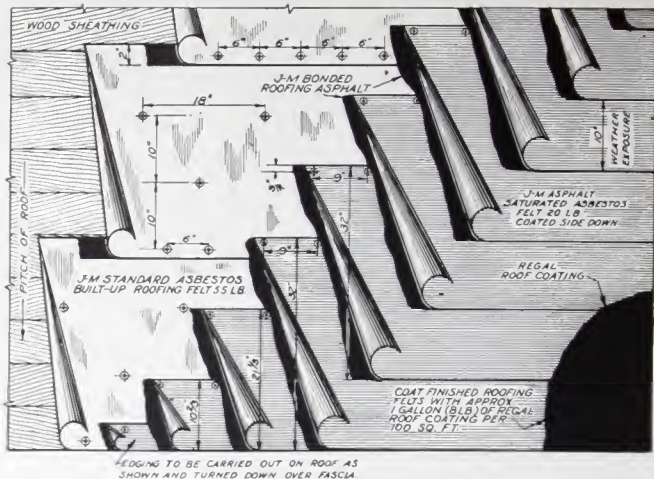
# Johns-Manville Bonded Built-up Roofs

Specification Number	Page No.	Pitch of Roof per Foot, in Inches	Bond, Years (See Note)	Underwriters' Classification	Surface	Number of Plies and Kind of Felt	Number of Mappings Asphalt [A] or Felt [F]	Weight of Materials, in Pounds per Square							Total Weight per Square, in Pounds		
								Sheathing Paper	Asbestos	Rag	Asphalt	Pitch	Roof Coating	Gravel	Slag	Smooth Surface or Crushed Slate	Gravel Surface
NON-COMBUSTIBLE (except Pre-cast Gypsum) DECKS																	
Smooth Surface																	
101	22	1/4 to 9	20	A	Smooth	One 35-lb. Asphalt Saturated Asbestos Felt Two 20-lb. Asphalt Saturated Asbestos Felt	A-3	—	95	—	60	—	8	—	—	153	—
201	22	1/4 to 9	15	—	Smooth	One No. 45 Asphalt Saturated Rag Felt Two 10-lb. Asphalt Saturated Asbestos Felt	A-3	—	40	10	60	—	8	—	—	188	—
203	23	1/4 to 9	10	—	Smooth	One No. 40 Asphalt Saturated Rag Felt Two 20-lb. Asphalt Saturated Asbestos Felt	A-3	—	40	33 1/2	60	—	8	—	—	171 1/2	—
Gravel or Slag Surface																	
302	24	1/4 to 2	10	A	Gravel or Slag	Four 15-lb. Asphalt Saturated Rag Felt	A-3	—	—	85	175	—	—	400	300	—	640 540
305	25	1/4 to 2	15	A	Gravel or Slag	Three 15-lb. Asphalt Saturated Rag Felt	A-3	—	—	40	145	—	—	400	300	—	580 484
303	25	2 to 4	10	A*	Slag	Four 15-lb. Asphalt Saturated Rag Felt	A-3	—	—	85	185	—	—	—	—	—	480
613	27	Less than 1/4	20	A	Gravel or Slag	Four 15-lb. Tar Saturated Asbestos Felt	P-3	—	85	—	—	175	—	400	300	—	640 540
602	26	1/4 to 1 1/2	20	A	Gravel or Slag	Four 15-lb. Tar Saturated Asbestos Felt	P-3	—	85	—	—	175	—	400	300	—	640 540
605	26	1/4 to 1 1/2	15	A	Gravel or Slag	Three 15-lb. Tar Saturated Asbestos Felt	P-3	—	40	—	—	150	—	400	300	—	600 499
603	27	2 to 6 1/2	10	A*	Slag	Four 15-lb. Tar Saturated Asbestos Felt	P-3 (A-3)	—	85	—	45	35	—	—	—	—	425
NON-COMBUSTIBLE (except Pre-cast Gypsum) DECKS WITH RIGID INSULATION																	
Smooth Surface																	
105	23	1/4 to 9	20	A	Smooth	Four 20-lb. Asphalt Saturated Asbestos Felt	A-3	—	80	—	150	—	8	—	—	238	—
107	24	1/4 to 9	15	A	Smooth	Three 20-lb. Asphalt Saturated Asbestos Felt	A-3	—	80	—	90	—	8	—	—	218	—
Gravel or Slag Surface																	
607	28	1/4 to 1 1/2	20	A	Gravel or Slag	Four 15-lb. Tar Saturated Asbestos Felt	P-3	—	85	—	—	175	—	400	300	—	640 540
609	29	1/4 to 1 1/2	15	A	Gravel or Slag	Three 15-lb. Tar Saturated Asbestos Felt	P-3	—	40	—	—	150	—	400	300	—	600 499
611	29	2 to 6 1/2	10	A*	Slag	Four 15-lb. Tar Saturated Asbestos Felt	P-3 (A-3)	—	85	—	45	35	—	—	—	—	454
STEEL DECKS WITH RIGID INSULATION																	
Smooth Surface																	
108	30	1/2 to 9	20	A	Smooth	Four 20-lb. Asphalt Saturated Asbestos Felt	A-3	—	80	—	150	—	8	—	—	238	—
109	30	1/2 to 9	15	—	Smooth	Three 20-lb. Asphalt Saturated Asbestos Felt	A-3	—	80	—	90	—	8	—	—	218	—
APPLICATION OF INSULATION																	
500	31	Over Wood Decks. Application of J-M Rigid Roofing or Other Approved Rigid Insulation.															
501	32	Over Non Combustible Decks. Application of J-M Rigid Roofing or Other Approved Rigid Insulation.															
502	32	Over Steel Decks. Application of J-M Rigid Roofing or Other Approved Rigid Insulation.															
J-M FLASHINGS																	
	33	When J-M Flashing is not less than 8" high or when Metal Cap Flashing is used with J-M Flashing.															
	33	When J-M Flashing extends full height of Wall and under Coping.															
	35	When J-M Flashing is not less than 8" high with Flashing extended through Wall.															
	35	Base Flashing in Connection with Rugged Block.															
* Class A Underwriters' Rating on Pitches up to and including 3" per foot. † 1/4" to 2" over Poured Gypsum Decks. 1/2 to 2" over Brick Tile or Bonded or Poured Concrete Decks. ‡ 1/2" to 2" over Poured Gypsum Decks. 1/2 to 1" over Poured Concrete Decks. § 1/2" to 2" over Poured Gypsum Decks. 1 to 2" over Poured Concrete Decks. Note: No bonds issued on Pacific Coast.																	
** Available also, employing "Rag" felt instead of "Asbestos" felt. See note appended to the specification on page number indicated.																	

## JOHNS-MANVILLE 20 YEAR BUILT-UP ROOF

## SMOOTH SURFACED— ASPHALT— ASBESTOS FELTS

## INCLINES $\frac{1}{4}$ IN. TO 9 INS. PER FT. SPECIFICATION NO. 100



### BILL OF MATERIALS PER 100 SQ. FT.

BASE FELT: 1 layer of J-M Standard Asbestos Built-up Roofing Felt	55 lb.
FINISHING FELTS: 3 layers of J-M Asphalt-Saturated Asbestos Roofing Felt 20-lb.	60 lb.
ASPHALT: J-M Bonded Roofing Asphalt	90 lb.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

### ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound, and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

### INSTALLATION

General—If the pitch of the roof is  $\frac{3}{4}$ " to the foot or less, the 55-lb. asbestos felt may be laid either paralleling, or at right angles to, the pitch. The 20-lb. asbestos felts shall be laid at right angles to the pitch. If the pitch of the roof is over  $\frac{3}{4}$ " to the foot, all felts shall be laid to parallel the pitch. All felts shall be turned up 2" on all

vertical surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Roofing—Lay one thickness of the 55-lb. asbestos felt, lapping the sheets 2", sealing the laps with the asphalt and nailing at 6" centers through the laps and at 18" centers through the longitudinal center of each sheet, in two lines spaced 10" apart, the nails to be staggered.

Over the 55-lb. asbestos felt, lay three plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 22" over the preceding one, mopping the full width under each with the asphalt and nailing at 9" centers adjacent to the back edge.

Coat the entire surface with the roof coating.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

### GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Twenty-Year Guaranty Bond.

## 15 YEAR BUILT-UP ROOF SMOOTH SURFACED • ASPHALT • ASBESTOS FELTS INCLINES $\frac{1}{4}$ IN. TO 9 INS. PER FT. SPECIFICATION NO. 103

### BILL OF MATERIALS PER 100 SQ. FT.

BASE FELT: J-M Standard Asbestos Built-up Roofing Felt	55 lb.
FINISHING FELTS: J-M Asphalt-Saturated Asbestos Roofing Felt 20-lb.	40 lb.
ASPHALT: J-M Bonded Roofing Asphalt	60 lb.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

### ROOF DECK

(a) Roof construction, including cants, covers or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound, and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

### INSTALLATION

General—If the pitch of the roof is  $\frac{3}{4}$ " to the foot or less, the 55-lb. asbestos felt may be laid either paralleling, or at right angles to, the pitch. The 20-lb. asbestos felts shall be laid at right angles to the pitch. If the pitch of the roof is over  $\frac{3}{4}$ " to the foot, all felts shall be laid to parallel the pitch. All felts shall be turned up 2" on all

vertical surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Roofing—Lay one thickness of the 55-lb. asbestos felt, lapping the sheets 2", sealing the laps with the asphalt and nailing at 6" centers through the laps and at 18" centers through the longitudinal center of each sheet, in two lines spaced 10" apart, the nails to be staggered.

Over the 55-lb. asbestos felt, lay two plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 17" over the preceding one, mopping the full width under each with the asphalt and nailing at 9" centers adjacent to the back edge.

Coat the entire surface with the roof coating.

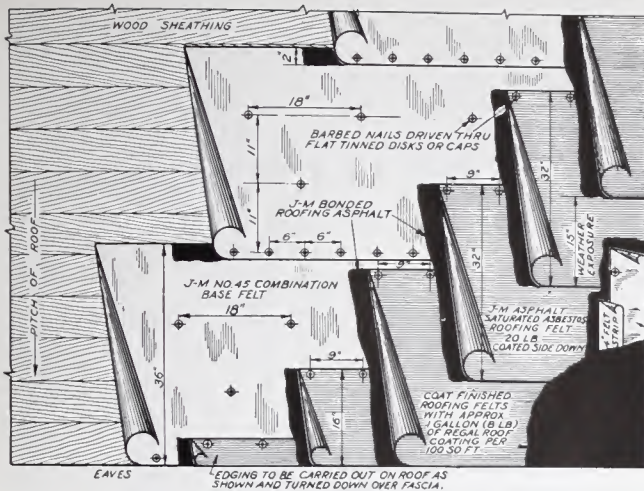
Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

### GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Fifteen-Year Guaranty Bond.

# OVER WOOD DECKS



## JOHNS-MANVILLE 15 YEAR BUILT-UP ROOF SMOOTH SURFACED— ASPHALT— ASBESTOS AND RAG FELTS INCLINES $\frac{1}{4}$ IN. TO 9 INS. PER FT. SPECIFICATION No. 200

### BILL OF MATERIALS PER 100 SQ. FT.

BASE FELT: 1 layer of J-M No. 45 Base Felt (Rag Felt) (50 lbs. per 108 sq. ft.)	50 lb.
FINISHING FELTS: 2 layers of J-M Asphalt-Saturated Asbestos Roofing Felt 20-lb.	40 lb.
ASPHALT: J-M Bonded Roofing Asphalt.	60 lb.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

### ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound, and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

### INSTALLATION

General—If the pitch of the roof is  $\frac{3}{4}$ " to the foot or less, the 45-lb. rag felt may be laid either paralleling, or at right angles to the pitch. The 20-lb. asbestos felts shall be laid at right angles to the pitch. If the pitch of the roof is over  $\frac{3}{4}$ " to the foot, all felts shall be laid

to parallel the pitch. All felts shall be turned up 2" on all vertical surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Roofing—Lay one thickness of the 50-lb. rag felt, lapping the sheets 2", sealing the laps with the asphalt and nailing at 6" centers through the laps and at 18" centers through the longitudinal center of each sheet in two lines spaced 11" apart, the nails to be staggered.

Over the 50-lb. rag felt, lay two plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 17" over the preceding one, mopping the full width under each with the asphalt and nailing at 9" centers adjacent to the back edge.

Coat the entire surface with the roof coating.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

### GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Fifteen-Year Guaranty Bond.

## 10 YEAR BUILT-UP ROOF SMOOTH SURFACED • ASPHALT • ASBESTOS AND RAG FELTS INCLINES $\frac{1}{4}$ IN. TO 9 INS. PER FT. SPECIFICATION No. 202

### BILL OF MATERIALS PER 100 SQ. FT.

BASE FELT: 1 layer of J-M No. 30 Combination Base Felt (Rag Felt)	33½ lb.
FINISHING FELTS: 2 layers of J-M Asphalt-Saturated Asbestos Roofing Felt 20-lb.	40 lb.
ASPHALT: J-M Bonded Roofing Asphalt.	60 lb.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

### ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound, and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

### INSTALLATION

General—If the pitch of the roof is  $\frac{3}{4}$ " to the foot or less, the 33½-lb. rag felt may be laid either paralleling, or at right angles to the pitch. The 20-lb. asbestos felts shall be laid at right angles to the

pitch. If the pitch of the roof is over  $\frac{3}{4}$ " to the foot, all felts shall be laid to parallel the pitch. All felts shall be turned up 2" on all vertical surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Roofing—Lay one thickness of the 33½-lb. rag felt, lapping the sheets 2", sealing the laps with the asphalt and nailing at 6" centers through the laps and at 18" centers through the longitudinal center of each sheet in two lines spaced 11" apart, the nails to be staggered.

Over the 33½-lb. rag felt, lay two plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 17" over the preceding one, mopping the full width under each with the asphalt and nailing at 9" centers adjacent to the back edge.

Coat the entire surface with the roof coating.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

### GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Ten-Year Guaranty Bond.



# OVER WOOD OR PRE-CAST GYPSUM DECKS

## 10 YEAR BUILT-UP ROOF SLAG SURFACED • ASPHALT • RAG FELTS INCLINES 2 INS. TO 4 INS. PER FT.

**SPECIFICATION NO. 301**

### BILL OF MATERIALS PER 100 SQ. FT.

FELTS: 5 layers of J-M Bonded Asphalt-Saturated Rag Felt 15 lb. (16¼ lb. per 108 sq. ft.)	81 lb.
ASPHALT: J-M Bonded Roofing Asphalt	150 lb.
SURFACING: Slag	250 lb.

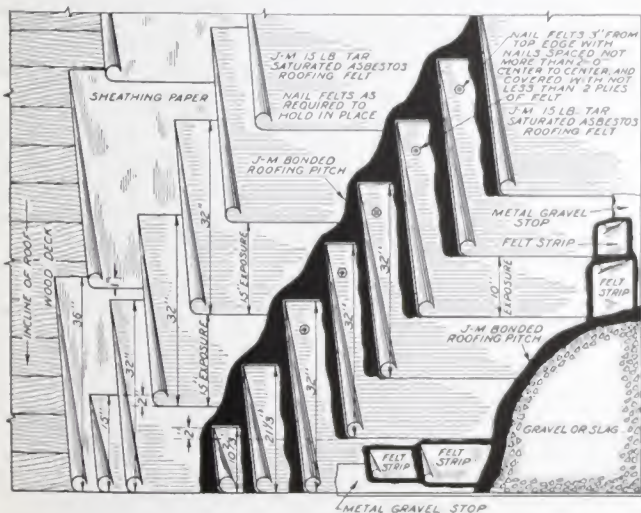
### ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound, and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

### INSTALLATION

**General**—All roofing felts shall be turned up 2" on all vertical surfaces without being cemented thereto. All nails shall be driven through flat metal disks.



### BILL OF MATERIALS PER 100 SQ. FT.

SHEATHING PAPER: (Used on wood deck only) 1 layer (5 lb. per 100 sq. ft.)	5 lb.
FELTS: 5 layers of J-M 15-lb. Tar-Saturated Asbestos Felt (16¼ lb. per 108 sq. ft.)	81 lb.
PITCH: J-M Bonded Roofing Pitch	150 lb.
SURFACING: Gravel or Slag	400 lb. or 300 lb.

### ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound, and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

### INSTALLATION

**General**—All roofing felts shall be turned up 2" on all vertical masonry surfaces and 4" on all vertical wood surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

**Roofing**—Lay five plies of the 15-lb. rag felt, lapping each sheet 29 1/5" over the preceding one, mopping between plies with the asphalt to within 4" of the back edge of the underlying felt and nailing at 12" centers, 10" from the back edge.

Over the entire surface mop a uniform coating of the asphalt and embed therein, while hot, not less than 250 lbs. of slag for each 100 sq. ft. of roof surface.

**Flashing**—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

### GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Ten-Year Guaranty Bond.

## JOHNS-MANVILLE 20 YEAR BUILT-UP ROOF

## SLAG OR GRAVEL SURFACED— PITCH (TAR)— ASBESTOS FELTS\*

## INCLINES ¼ IN. TO 2 INS. PER FT. SPECIFICATION NO. 600\*

\*A built-up roof of this same construction is available differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

SPECIFICATION NO. 700

FELTS: (Change name of felt to "J-M Bonded Tar Saturated Rag Felt 15 lb.")

**Roofing**—If application is over wood sheathing, lay one thickness of sheathing paper, lapping the sheets not less than 1".

Lay two plies of the 15-lb. tar-saturated roofing felt, lapping each sheet 17" over the preceding one and nailing sufficiently to hold in place.

Over these felts lay three additional plies of the 15-lb. tar-saturated roofing felt, lapping each sheet 22" over the preceding one, mopping the full width under each with the pitch and nailing at 24" centers, 3" from the back edge.

Over the entire surface pour a uniform coating of the pitch and embed therein, while hot, not less than 400 lbs. of gravel or 300 lbs. of slag for each 100 sq. ft. of roof surface.

**Flashing**—(Copy from J-M Standard Specification for Flashing, page 33.)

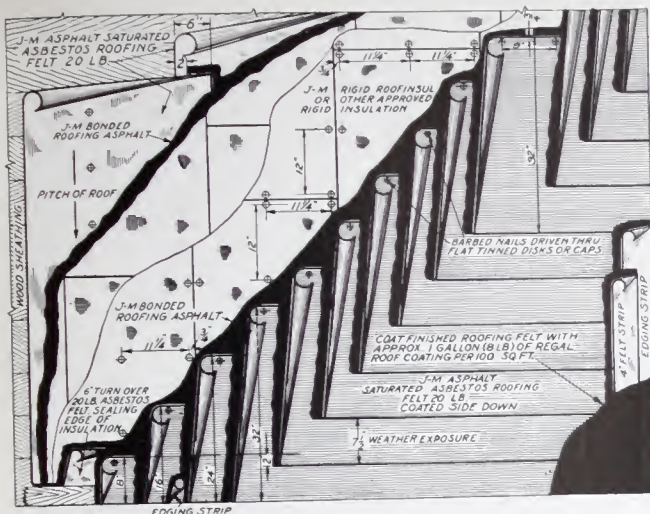
(If a bond is required, add the following:)

### GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Twenty-Year Guaranty Bond.

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# OVER INSULATION ON WOOD DECKS



## JOHNS-MANVILLE 20 YEAR BUILT-UP ROOF

### SMOOTH SURFACED— ASPHALT— ASBESTOS FELTS— INSULATION

### INCLINES 1/4 IN. TO 9 INS. PER FT. SPECIFICATION NO. 104

**BILL OF MATERIALS PER 100 SQ. FT.**

<b>FELTS:</b> 4 layers of J-M Asbestos Asphalt-Saturated Felt 20 lb. (coated one side) (An additional ply of 20-lb. asbestos felt is specified in specification No. 500 for application under the insulation) .....	80 lb.
<b>ASPHALT:</b> J-M Bonded Roofing Asphalt .....	120 lb.
For mopping insulation over felt .....	30 lb.
For mopping each additional ply of insulation .....	30 lb.
<b>ROOF COATING:</b> J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

#### ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound, and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

#### INSTALLATION

**General**—If the pitch of the roof is 3" to the foot or less, the felts shall be laid at right angles to the pitch. If the pitch of the roof is over 3" to the foot, the felts shall be laid to parallel the pitch. The roof felts shall be turned up 2" on all vertical surfaces without being cemented thereto. The felt applied under insulation shall be similarly turned up a distance 6" greater than the thickness of such insulation and shall overhang all roof edges a similar amount. All nails shall be driven through flat metal disks.

**Insulation**—(Copy from J-M Standard Specification No. 500, page 31.)

**Roofing**—Lay four plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 24 1/2" over the preceding one, mopping the full width under each with the asphalt and nailing at 9" centers adjacent to the back edge, or, if job conditions make it desirable to apply the roofing in two operations, lay two plies of the 20-lb. asbestos felt with the coated side down, lapping each sheet 17" over the preceding one, mopping the full width under each with the asphalt, nailing at 9" centers adjacent to the back edge, and over these felts, lay two additional plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 17" over the preceding one, mopping the full width under each with the asphalt and nailing at 9" centers adjacent to the back edge—except, on roof pitches under 3" to the foot, nailing may be omitted.

Coat the entire surface with roof coating.

**Flashing**—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

#### GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Twenty-Year Guaranty Bond.

## 15 YEAR BUILT-UP ROOF SMOOTH SURFACED • ASPHALT • ASBESTOS FELTS • INSULATION INCLINES 1/4 IN. TO 9 INS. PER FT. SPECIFICATION NO. 106

**BILL OF MATERIALS PER 100 SQ. FT.**

<b>FELTS:</b> 3 layers of J-M Asbestos Roofing Felt 20 lb. (coated one side) (An additional ply of 20-lb. asbestos felt is specified in Specification No. 500 for application under the insulation) .....	60 lb.
<b>ASPHALT:</b> J-M Bonded Roofing Asphalt .....	90 lb.
For mopping insulation over felt .....	30 lb.
For mopping each additional ply of insulation .....	30 lb.
<b>ROOF COATING:</b> J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

#### ROOF DECK

(Copy from Specification No. 104 above.)

#### INSTALLATION

**General**—(Copy from Specification No. 104 above.)

**Insulation**—(Copy from J-M Standard Specification No. 500, page 31.)

**Roofing**—Lay three plies of the 20-lb. asbestos felt, lapping each sheet 22" over the preceding one, mopping the full width under each with the asphalt and nailing at 9" centers adjacent to the back edge—except, on roof pitches under 3" to the foot, nailing may be omitted.

Coat the entire surface with the roof coating.

**Flashing**—(Copy from J-M Standard Specification for Flashing, page 33.)

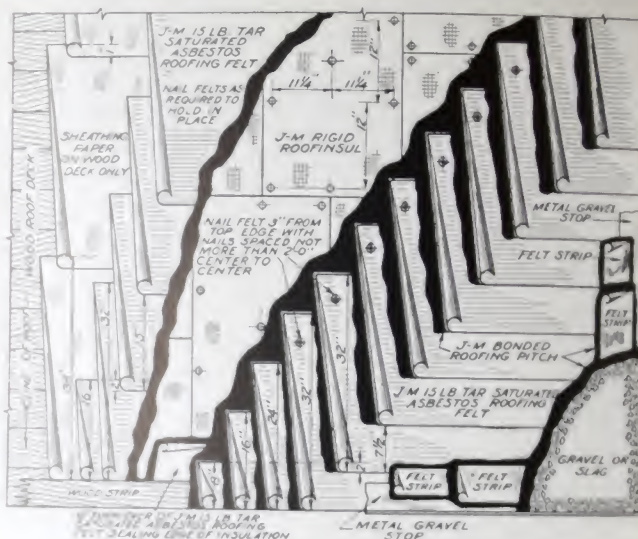
#### GUARANTEE

(Same as for Specification No. 104 above, except change to "Fifteen-Year".)

## JOHNS-MANVILLE 20 YEAR BUILT-UP ROOF

### SLAG OR GRAVEL SURFACED— PITCH (TAR)— ASBESTOS FELTS\*— INSULATION

**INCLINES  $\frac{1}{4}$  IN. TO 2 INS. PER FT.  
SPECIFICATION NO. 606\***



#### BILL OF MATERIALS PER 100 SQ. FT.

SHEATHING PAPER: (Laid over wood deck only) 1 sheet 17 in. per 100 sq. ft.	100
*FELTS: (Under Insulation) 2 layers of J-M 15-lb. Tar-Saturated Asbestos Roofing Felt (10 1/2 lb. per 100 sq. ft.)	200
*FELTS: (For Built-Up Roof) 4 layers of J-M 15-lb. Tar-Saturated Asbestos Roofing Felt (10 1/2 lb. per 100 sq. ft.)	400
PITCH: (Under Insulation) J-M Bonded Roofing Pitch	50
PITCH: (For Built-Up Roof) J-M Bonded Roofing Pitch	175
SURFACING: Gravel or Slag	500

#### ROOF DECK

(a) Roof construction, including eaves, covers or filters, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound, and dry, in a satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded to the wall structure, in which to secure the flooring.

#### INSTALLATION

**General**—The felt applied under the insulation shall be turned up on, but not cemented to, all vertical surfaces to a height 6" greater than the thickness of the insulation and shall overhang all roof edges a similar amount. All felts applied over the insulation shall be turned up 2" on all vertical masonry surfaces and 6" on all vertical wood surfaces without being cemented thereto. All nails shall be driven through flat metal studs.

**Felts Under Insulation**—If application is over wood sheathing lay one thickness of sheathing paper (weighing 5 lb. per 100 sq. ft.) lapping the sheets not less than 1".

Lay two plies of the 15-lb. tar-saturated felt, lapping each sheet 17" over the preceding one and nailing sufficiently to hold in place.

**Insulation**—Lay the Roofinsul with the rough side down and with all end joints broken, mopping the full width under each sheet with the pitch. The edges of the sheets at the joints shall be thoroughly sealed with the pitch. The insulation shall be isolated into areas approximately 30" x 30" space by patchings of one ply of the 15-lb. tar-saturated roofing felt, mopped the full width with the pitch, to

extend not less than 4" over the edge of the insulation in place and not less than 4" under the adjoining insulation to be laid. Nail each sheet of the insulation at 12" centers adjacent to the longitudinal edges and staggered through the longitudinal center.

If to be applied in more than one layer, succeeding layers shall be applied in the same manner as the first layer (unless high humidity and condensation conditions do not exist, in which event the mopping between layers may be omitted), the sheets of each layer to break joints with those of the preceding layers and nailing done through the top layer.

The upturned felt at vertical surfaces and roof edges shall be turned down and mopped solidly to the Roofinsul.

Insulation shall not be left exposed to the weather. No more insulation shall be laid down than can be completely covered with the roofing felts on the same day. At the end of the day's work, roofing felts shall be turned down over the exposed edges of the insulation and mopped solidly.

**Roofing**—Lay four plies of the 15-lb. tar-saturated roofing felt, lapping each sheet 24 1/2" over the preceding one, mopping the full width under each with the pitch and nailing at 24" centers, 3" from the back edge.

Over the entire surface pour a uniform coating of the pitch and cooled therein, while hot, not less than 400 lbs. of gravel or 500 lbs. of slag for each 100 sq. ft. of roof surface.

**Flashing**—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following.)

#### GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Twenty-Year Guaranty Bond.

\*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

**SPECIFICATION NO. 706**

**FELTS:** (Change name of felt to "J-M Bonded Tar-Saturated Rag Felt 15 lb.")

#### BILL OF MATERIALS PER 100 SQ. FT.

SHEATHING PAPER: (Laid over wood deck only) 1 sheet 17 in. per 100 sq. ft.	100
*FELTS: (Under Insulation) Johns-Manville Roofing Felt	200
*FELTS: (For Built-Up Roof) Johns-Manville Roofing Felt	400
PITCH: (Under Insulation) Johns-Manville Roofing Pitch	50
PITCH: (For Built-Up Roof) Johns-Manville Roofing Pitch	175
SURFACING: Gravel or Slag	500

(Name as for Specification No. 606.)

General—(Same as Specification No. 606.)  
Felts Under Insulation—(Same as Specification No. 606.)

**10 YEAR BUILT-UP ROOF  
SLAG SURFACED—  
INCLINES 2**

#### BILL OF MATERIALS PER 100 SQ. FT.

SHEATHING PAPER: (Laid over wood deck only) 1 sheet 17 in. per 100 sq. ft.	100
*FELTS: (Under Insulation) Johns-Manville Roofing Felt	200
*FELTS: (For Built-Up Roof) Johns-Manville Roofing Felt	400
PITCH: (Under Insulation) Johns-Manville Roofing Pitch	50
PITCH: (For Built-Up Roof) Johns-Manville Roofing Pitch	175
SURFACING: Asphalt or Bitumastic	500

(Name as for Specification No. 606.)

General—(Same as Specification No. 606.)

**SLAG OR  
GRAVEL SURFACED—  
PITCH (TAR)—  
ASBESTOS FELTS\*—  
INSULATION**

**INCLINES 1/4 IN. TO 2 INS. PER FT.**  
**SPECIFICATION NO. 608\***

<b>BILL OF MATERIALS PER 100 SQ. FT.</b>	
<b>SHEATHING PAPER:</b> (Used over wood deck only) 1 layer (5 lb. per 108 sq. ft.) .....	5 lb.
* <b>FELTS: (Under Insulation)</b> 2 layers of J-M 15-lb. Tar-Saturated Asbestos Roofing Felt (16½ lb. per 108 sq. ft.) .....	32½ lb.
* <b>FELTS: (For Built-Up Roof)</b> 3 layers of J-M 15-lb. Tar-Saturated Asbestos Roofing Felt (16½ lb. per 108 sq. ft.) .....	49 lb.
<b>PITCH: (Under Insulation)</b> J-M Bonded Roofing Pitch.....	30 lb.
<b>PITCH: (For Built-Up Roof)</b> J-M Bonded Roofing Pitch.....	150 lb.
<b>SURFACING:</b> Gravel .....	400 lb.
or Slag .....	300 lb.

(Same as for Specification No. 606 opposite.)

General—(Same as for Specification No. 606 opposite.)  
 Felts Under Insulation—(Same as Specification No. 606 opposite.)  
 Insulation—(Same as for Specification No. 606 opposite.)

**10 YEAR BUILT-UP ROOF**  
**SLAG SURFACED • PITCH (TAR) • ASBESTOS FELTS\* • INSULATION**  
**INCLINES 2 INS. TO 6 INS. PER FT. \_\_\_\_\_ SPECIFICATION NO. ( )**

BILL OF MATERIALS PER 100 SQ. FT.	
SHEATHING PAPER: (Used over wood deck only) 1 layer (5 lb. per 108 sq. ft.).....	5 lb.
*FELTS: (Under Insulation) 2 layers of J-M 15-lb. Tar-Saturated Asbestos Roofing Felt (16¼ lb. per 108 sq. ft.).....	32½ lb.
*FELTS: (For Built-Up Roofs) 4 layers of J-M 15-lb. Tar-Saturated Asbestos Roofing Felt (16¼ lb. per 108 sq. ft.).....	65 lb.
PITCH: (Under Insulation) J-M Bonded Roofing Pitch.....	30 lb.
PITCH: (For Mopping in between Built-Up Roofing Felts) J-M Bonded Roofing Pitch.....	105 lb.
ASPHALT: (For Top Surfacing Built-Up Roofing Felts) J-M Bonded Roofing Asphalt.....	45 lb. approx.
SURFACING: Slag.....	250 lb.

(Same as for Specification No. 606 opposite.)

General—(Same as for Specification No. 606 opposite.)

(If a bond is required, add the following:)

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Fifteen-Year Guaranty Bond.

SPECIFICATION NO. 708

FELTS: (Change name of felt to "J-M Bonded Tar Saturated Rag Felt 15 lb.")

Insulation—(Same as for Specification No. 606 opposite.)

Over the entire surface mop a uniform coating of the asphalt and embed therein, while hot, not less than 250 lbs. of slag for each 100 sq. ft. of roof surface.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(Same as for Specification No. 606, except change to "Ten-Year".)

\*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

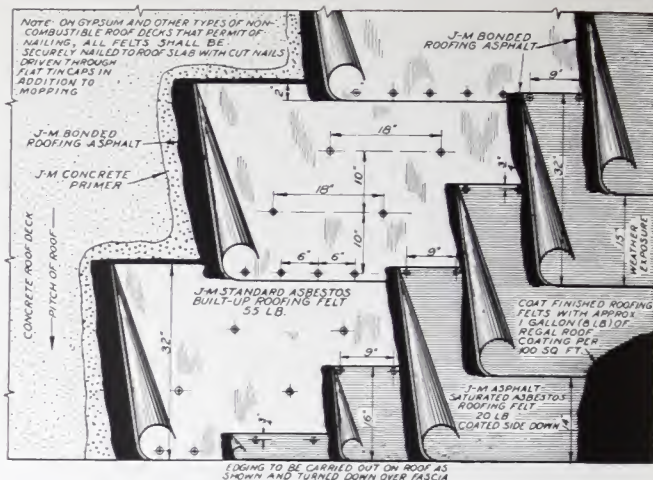
**SPECIFICATION NO. 710**

SPECIFICATION NO. 710  
FELTS: (Change name of felt to "J-M Bonded Tar Saturated Rag Felt 15 lb.")

## JOHNS-MANVILLE 20 YEAR BUILT-UP ROOF

## SMOOTH SURFACED— ASPHALT— ASBESTOS FELTS

## INCLINES 1/4 IN. TO 9 INS. PER FT. SPECIFICATION No. 101



### BILL OF MATERIALS PER 100 SQ. FT.

BASE FELT: 1 layer of J-M Standard Asbestos Built-Up Roofing Felt	55 lb.
FINISHING FELTS: 2 layers of J-M Asphalt-Saturated Asbestos Roofing Felt 20-lb.	40 lb.
PRIMER: J-M Concrete Primer (8 lb. per gal.):	
Over Concrete	1 gal.
Over Gypsum	1 1/2 to 2 gal.
ASPHALT: J-M Bonded Roofing Asphalt	90 lb.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

### ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound, and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

### INSTALLATION

General—If the pitch of the roof is 3" to the foot or less, the 55-lb. asbestos felt may be laid either paralleling, or at right angles to, the pitch. The 20-lb. asbestos felts shall be laid at right angles to the pitch. If the pitch of the roof is over 3" to the foot, all felts shall be laid to parallel the pitch. All felts shall be turned up 2" on all vertical surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

## 15 YEAR BUILT-UP ROOF

## SMOOTH SURFACED • ASPHALT • ASBESTOS AND RAG FELTS

## INCLINES 1/4 IN. TO 9 INS. PER FT.

## SPECIFICATION No. 201

### BILL OF MATERIALS PER 100 SQ. FT.

BASE FELT: 1 layer of J-M No. 45 Base Felt (Rag Felt) (50 lb. per 108 sq. ft.)	50 lb.
FINISHING FELTS: 2 layers of J-M Asphalt-Saturated Asbestos Roofing Felt 20-lb.	40 lb.
PRIMER: J-M Concrete Primer (8 lb. per gal.):	
Over Concrete	1 gal.
Over Gypsum	1 1/2 to 2 gal.
ASPHALT: J-M Bonded Roofing Asphalt	90 lb.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

### ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound, and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

Roofing—Coat all surfaces which are to receive the roofing with the concrete primer and allow to dry.

Lay one thickness of the 55-lb. asbestos felt, lapping the sheets 2", mopping the full width under each with the asphalt and, if roof construction permits, nailing at 6" centers through the laps and at 18" centers through the longitudinal center of each sheet in two lines spaced 10" apart, the nails to be staggered.

Over the 55-lb. asbestos felt, lay two plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 17" over the preceding one, mopping the full width under each with the asphalt and, if roof construction permits, nailing at 9" centers adjacent to the back edge.

With nailing strips provided as required, nail each sheet of the 55-lb. asbestos felt at 6" centers at each nailing strip. Nail each sheet of the 20-lb. asbestos felt at each nailing strip 3/4" from the back edge.

Coat the entire surface with the roof coating.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

### GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Twenty-Year Guaranty Bond.

### INSTALLATION

General—(Same as for Specification No. 101, above, except change "55-lb. asbestos felt" to "50-lb. rag felt.")

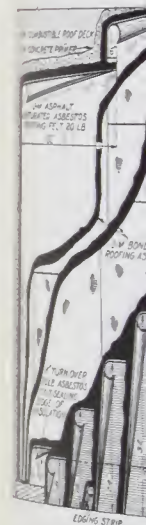
Roofing—(Copy from Specification No. 101, changing "55-lb. asbestos felt" to "50-lb. rag felt," and change the spacing of the nails from 10" to 11".)

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

### GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Fifteen-Year Guaranty Bond.



## 10 YEAR BUILT-UP ROOF

### SMOOTH SURFACED • ASPHALT • ASBESTOS AND RAG FELTS

#### INCLINES 1/4 IN. TO 9 INS. PER FT. SPECIFICATION NO. 203

##### BILL OF MATERIALS PER 100 SQ. FT.

BASE FELT: 1 layer of J-M No. 30 Combination Base Felt.....	33 1/2 lb.
FINISHING FELTS: 2 layers of J-M Asphalt-Saturated Asbestos	
Roofing Felt 20-lb.....	40 lb.
PRIMER: J-M Concrete Primer (8 lb. per gal.):	
Over Concrete .....	1 gal.
Over Gypsum .....	1 1/2 to 2 gal.
ASPHALT: J-M Bonded Roofing Asphalt.....	90 lb.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

##### ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound, and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, em-

bedded in the wall structure, to which to secure the flashing.

##### INSTALLATION

General—(Same as for Specification No. 101 opposite, except change "55-lb. asbestos felt" to "33 1/2-lb. rag felt.")

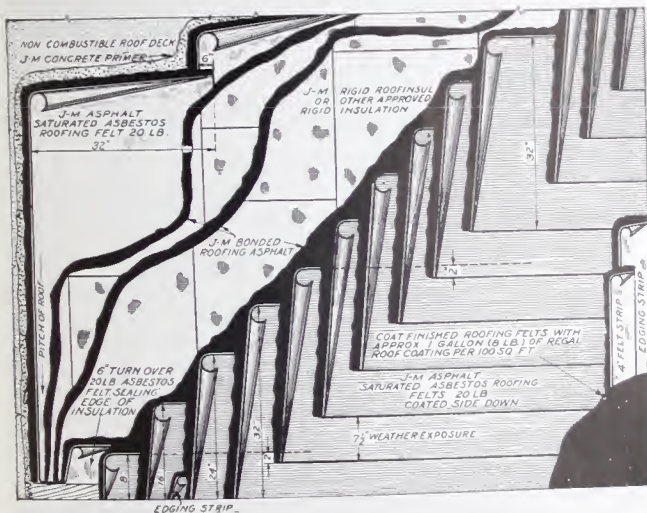
Roofing—(Copy from Specification No. 101 opposite, changing "55-lb. asbestos felt" to "33 1/2-lb. rag felt," and change the spacing of the nails from 10" to 11".)

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

##### GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Ten-Year Bond.



##### BILL OF MATERIALS PER 100 SQ. FT.

FELTS: 4 layers of J-M Asphalt-Saturated Asbestos Roofing Felt, 20-lb.	80 lb.
(An additional ply of 20-lb. asbestos felt is specified in Specification No. 501 for application under the insulation)	
ASPHALT: J-M Bonded Roofing Asphalt.....	120 lb.
For mopping felt and insulation to deck, additional.....	approx. 40 lb.
PRIMER: J-M Concrete Primer (8 lb. per gal.):	
Over Concrete .....	1 gal.
Over Gypsum .....	1 1/2 to 2 gal.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

##### ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound, and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

##### INSTALLATION

General—If the pitch of the roof is 3" to the foot or less, the felts shall be laid at right angles to the pitch. If the pitch of the roof is over 3" to the foot, the felts shall be laid to parallel the pitch. The roof felts shall be turned up 2" on all vertical surfaces without being cemented thereto. The felt applied under insulation shall be similarly turned up a distance 6" greater than the thickness of such insulation and shall overhang all roof edges a similar amount. All nails shall be driven through flat metal disks.

## JOHNS-MANVILLE

### 20 YEAR BUILT-UP ROOF

#### SMOOTH SURFACED— ASPHALT— ASBESTOS FELTS

##### OVER INSULATION ON NON-COMBUSTIBLE DECKS\*

#### INCLINES 1/4 IN. TO 9 INS. PER FT. SPECIFICATION NO. 105

Insulation—(Copy from J-M Standard Specification No. 501, page 32.)

Roofing—Lay four plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 24 1/2" over the preceding one, mopping the full width under each with the asphalt or, if job conditions make it desirable to apply the roofing in two operations, lay two plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 17" over the preceding one, mopping the full width under each with the asphalt, and over these felts lay two additional plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 17" over the preceding one, mopping the full width under each with the asphalt.

If pitch of roof exceeds 3" to the foot, and roof construction permits, each sheet shall be nailed at 9" centers adjacent to the back edge. With nailing strips provided as required, nail each sheet at each nailing strip, all nails to be placed so as to be covered by not less than two plies of felt.

Coat the entire surface with the roof coating.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

##### GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Twenty-Year Guaranty Bond.

\*For application of insulation, see Specification No. 501, page 32.

## 15 YEAR BUILT-UP ROOF

### SMOOTH SURFACED • ASPHALT • ASBESTOS FELTS

OVER INSULATION ON NON-COMBUSTIBLE DECKS

INCLINES  $\frac{1}{4}$  IN. TO 9 INS. PER FT.

**SPECIFICATION No. 107**

#### BILL OF MATERIALS PER 100 SQ. FT.

FELTS: 3 layers of J-M Asphalt-Saturated Asbestos Roofing Felt 20-lb. (An additional ply of 20-lb. asbestos felt is specified in Specification No. 501 for application under the insulation)	60 lb.
ASPHALT: J-M Bonded Roofing Asphalt	90 lb.
For mopping insulation to deck	approx. 40 lb.
For mopping each additional ply of insulation	30 lb.
PRIMER: J-M Concrete Primer (8 lb. per gal.):	
Over Concrete	1 gal.
Over Gypsum	1½ to 2 gal.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

#### ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound, and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

#### INSTALLATION

General—If the pitch of the roof is 3" to the foot or less, the felts shall be laid at right angles to the pitch. If the pitch of the roof is over 3" to the foot, the felts shall be laid to parallel the pitch. The roof felts shall be turned up 2" on all vertical surfaces without being

cemented thereto. The felt applied under insulation shall be similarly turned up a distance 6" greater than the thickness of such insulation and shall over-hang all roof edges a similar amount. All nails shall be driven through flat metal disks.

Insulation—(Copy from J-M Specification No. 501, page 32.)

Roofing—Lay three plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 22" over the preceding one, mopping the full width under each with the asphalt.

If pitch of roof exceeds 3" to the foot, and roof construction permits, each sheet shall be nailed at 9" centers adjacent to the back edge. With nailing strips provided as required, nail each sheet at each nailing strip, all nails to be placed so as to be covered by not less than two plies of felt.

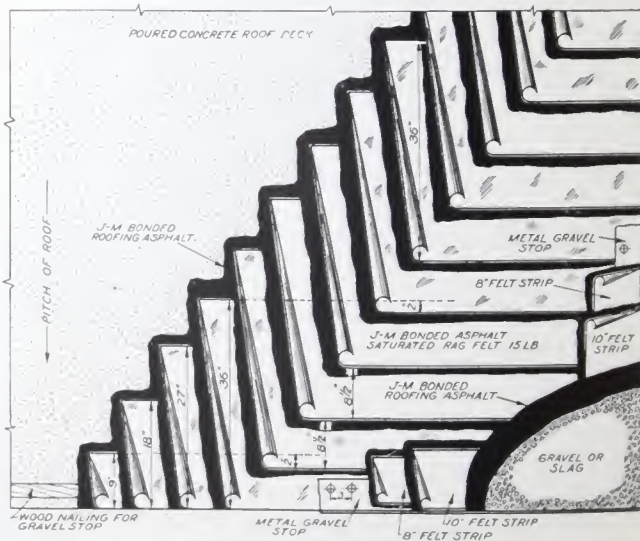
Coat the entire surface with the roof coating.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

If a bond is required, add the following:

#### GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Fifteen-Year Guaranty Bond.



#### INSTALLATION

General—All roofing felts shall be turned up 2" on all vertical surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Roofing—If application is over gypsum, coat all surfaces which are to receive the roofing with the asphalt primer and allow to dry.

Lay four plies of the 15-lb. rag felt, lapping each sheet 27½" over the preceding one, mopping the full width under each with the asphalt and, if roof construction permits, nailing at 12" centers, 3" from the back edge.

If roof construction is of precast concrete, the asphalt applied to the roof surface shall be omitted for a width of 4" each side of all joints between the slabs.

Over the entire surface pour a uniform coating of the asphalt and embed therein, while hot, not less than 400 lbs. of gravel or 300 lbs. of slag for each 100 sq. ft. of roof surface.

(Continued on opposite page)

## JOHNS-MANVILLE

### 20 YEAR BUILT-UP ROOF

### SLAG OR GRAVEL SURFACED— ASPHALT—RAG FELTS

OVER BOOK TILE, POURED OR PRECAST CONCRETE OR POURED GYPSUM DECKS

INCLINES  $\frac{1}{4}$  IN. TO 2 INS. PER FT.

**SPECIFICATION No. 302**

#### BILL OF MATERIALS PER 100 SQ. FT.

FELTS: 4 layers of J-M Bonded Asphalt-Saturated Rag Felt 15-lb. (16¼ lb. per 108 sq. ft.)	65 lb.
PRIMER: J-M Concrete Primer (8 lb. per gal.) over Gypsum	1½ to 2 gal.
ASPHALT: J-M Bonded Roofing Asphalt	175 lb.
SURFACING: Gravel	400 lb.
or Slag	300 lb.

#### ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound, and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

(Continued from opposite page)

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.) (If a bond is required, add the following:)

## GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Twenty-Year Guaranty Bond.

## 15 YEAR BUILT-UP ROOF

### SLAG OR GRAVEL SURFACED • ASPHALT • RAG FELTS

OVER BOOK TILE, POURED OR PRECAST CONCRETE OR POURED GYPSUM DECKS

INCLINES  $\frac{1}{4}$  IN. TO 2 INS. PER FT. SPECIFICATION NO. 305

#### BILL OF MATERIALS PER 100 SQ. FT.

FELTS: 3 layers of J-M Bonded Asphalt-Saturated Rag Felt 15-lb. (16 $\frac{1}{4}$ lb. per 108 sq. ft.)	49 lb.
PRIMER: J-M Concrete Primer over Gypsum	1 $\frac{1}{2}$ to 2 gal.
ASPHALT: J-M Bonded Roofing Asphalt	145 lb.
SURFACING: Gravel	400 lb.
or Slag	300 lb.

#### ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound, and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

#### INSTALLATION

General—All roofing felts shall be turned up 2" on all vertical surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Roofing—If application is over gypsum, coat all surfaces which are to receive the roofing with the primer and allow to dry.

Lay three plies of the 15-lb. rag felt, lapping each sheet 24 $\frac{3}{4}$ " over the preceding one, mopping the full width under each with the asphalt and, if roof construction permits, nailing at 12" centers, 3" from the back edge.

If roof construction is of precast concrete, the asphalt applied to the roof surface shall be omitted for a width of 4" each side of all joints between the slabs.

Over the entire surface pour a uniform coating of the asphalt and embed therein, while hot, not less than 400 lbs. of gravel or 300 lbs. of slag for each 100 sq. ft. of roof surface.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

## GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Fifteen-Year Guaranty Bond.

## 10 YEAR BUILT-UP ROOF

### SLAG SURFACED • ASPHALT • RAG FELTS

OVER POURED OR PRECAST CONCRETE OR POURED GYPSUM DECKS

INCLINES 2 INS. TO 4 INS. PER FT. SPECIFICATION NO. 303

#### BILL OF MATERIALS PER 100 SQ. FT.

PRIMER: J-M Concrete Primer over Gypsum	1 $\frac{1}{2}$ to 2 gal.
FELTS: 4 layers of J-M Bonded Asphalt-Saturated Rag Felt 15-lb. (16 $\frac{1}{4}$ lb. per 108 sq. ft.)	65 lb.
ASPHALT: J-M Bonded Roofing Asphalt	165 lb.
SURFACING: Slag	250 lb.

#### ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound, and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

#### INSTALLATION

General—All roofing felts shall be turned up 2" on all vertical surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Roofing—If application is over gypsum, coat all surfaces which are to receive the roofing with the primer and allow to dry.

Lay four plies of the 15-lb. rag felt, lapping each sheet 27 $\frac{1}{2}$ " over the preceding one, mopping the full width under each with the asphalt and, if roof construction permits, nailing at 12" centers, 3" from the back edge.

If roof construction is of precast concrete, the asphalt applied to the roof surface shall be omitted for a width of 4" each side of all joints between the slabs.

With nailing strips provided as required, nail each sheet at each nailing strip with two nails spaced 8" and 10" respectively from the back edge.

Over the entire surface mop a uniform coating of the asphalt and embed therein, while hot, not less than 250 lbs. of slag for each 100 sq. ft. of roof surface.

Flashing—(Copy from J-M Standard Specifications for Flashing, page 33.)

(If a bond is required, add the following:)

## GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Ten-Year Guaranty Bond.

## JOHNS-MANVILLE 20 YEAR BUILT-UP ROOF

### SLAG OR GRAVEL SURFACED— PITCH (TAR)— ASBESTOS FELTS\*

OVER BOOK TILE, POURED OR  
PRECAST CONCRETE DECKS  
INCLINES  $\frac{1}{4}$  IN. TO 1 IN. PER FT.

OVER POURED GYPSUM DECKS  
INCLINES  $\frac{1}{4}$  IN. TO 2 INS. PER FT.

### SPECIFICATION No. 602\*

#### BILL OF MATERIALS PER 100 SQ. FT.

*FELTS: 4 layers of J-M Tar-Saturated Asbestos Roofing Felt 15-lb. (16 $\frac{1}{4}$ lb. per 108 sq. ft.)	65 lb.
PITCH: J-M Bonded Roofing Pitch	175 lb.
SURFACING: Gravel	400 lb.
or Slag	300 lb.

#### ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound, and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

#### INSTALLATION

General—All roofing felts shall be turned up 2" on all vertical surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Roofing—Lay four plies of the 15-lb. tar-saturated roofing felt, lapping each sheet 24 $\frac{1}{2}$ " over the preceding one, mopping the full width under each with the pitch. If roof construction is of

## 15 YEAR BUILT-UP ROOF

### SLAG OR GRAVEL SURFACED • PITCH (TAR) • ASBESTOS FELTS\*

OVER BOOK TILE, POURED OR PRECAST CONCRETE DECKS • INCLINES  $\frac{1}{4}$  IN. TO 1 IN. PER FT.

OVER POURED GYPSUM DECKS • INCLINES  $\frac{1}{4}$  IN. TO 2 INS. PER FT. • SPECIFICATION No. 605\*

#### BILL OF MATERIALS PER 100 SQ. FT.

*FELTS: 3 layers of J-M Tar-Saturated Asbestos Roofing Felt 15-lb. (16 $\frac{1}{4}$ lb. per 108 sq. ft.)	49 lb.
PITCH: J-M Bonded Roofing Pitch	150 lb.
SURFACING: Gravel	400 lb.
or Slag	300 lb.

#### ROOF DECK

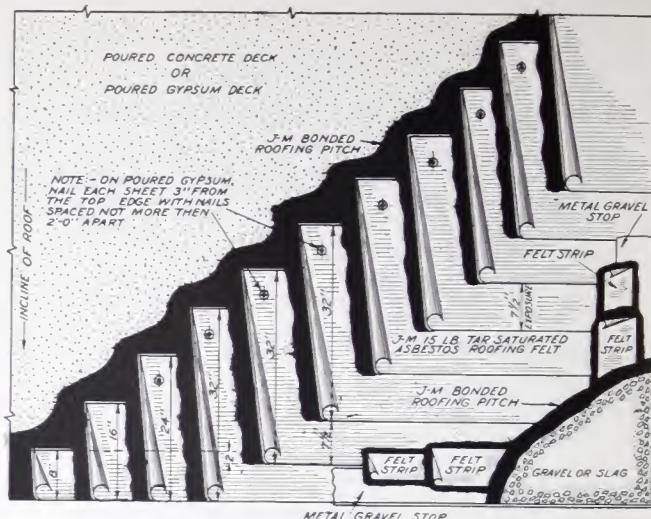
(Same as for Specification No. 602 above.)

#### INSTALLATION

General—(Same as for Specification No. 602 above.)

Roofing—Lay three plies of the 15-lb. tar-saturated roofing felt, lapping each sheet 22" over the preceding one, mopping the full width under each with the pitch. If roof construction is of poured gypsum, nail each sheet at 24" centers, 3" from the back edge.

If roof construction is of precast concrete, the pitch applied to the



poured gypsum, nail each sheet at 24" centers, 3" from the back edge.

If roof construction is of precast concrete, the pitch applied to the roof surface shall be omitted for a width of 4" each side of all joints between the slabs.

Over the entire surface pour a uniform coating of the pitch and embed therein, while hot, not less than 400 lbs. of gravel or 300 lbs. of slag for each 100 sq. ft. of roof surface.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

#### GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Twenty-Year Guaranty Bond.

\*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

#### SPECIFICATION NO. 702

FELTS: (Change name of felt to "J-M Bonded Tar Saturated Rag Felt 15 lb.")

roof surface shall be omitted for a width of 4" each side of all joints between the slabs.

Over the entire surface pour a uniform coating of the pitch and embed therein, while hot, not less than 400 lbs. of gravel or 300 lbs. of slag for each 100 sq. ft. of roof surface.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

#### GUARANTEE

(Same as for Specification No. 602 above, except change to "Fifteen-Year.")

\*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

#### SPECIFICATION NO. 705

FELTS: (Change name of felt to "J-M Bonded Tar Saturated Rag Felt 15 lb.")

# OVER NON-COMBUSTIBLE DECKS

## 10 YEAR BUILT-UP ROOF

### SLAG SURFACED • PITCH (TAR) • ASBESTOS FELTS\*

OVER POURED CONCRETE DECKS • INCLINES 1 IN. TO 6 INS. PER FT.

OVER POURED GYPSUM DECKS • INCLINES 2 INS. TO 6 INS. PER FT. • SPECIFICATION No. 603\*

#### BILL OF MATERIALS PER 100 SQ. FT.

*FELTS: 4 layers of J-M Tar-Saturated Asbestos Roofing Felt 15-lb. (16¼ lb. per 108 sq. ft.)	65 lb.
PITCH: J-M Bonded Roofing Pitch	65 lb.
ASPHALT: J-M Bonded Roofing Asphalt (for top surfacing only).	approx. 45 lb.
SURFACING: Slag	250 lb.

#### ROOF DECK

(Same as for Specification No. 602 on opposite page.)

#### INSTALLATION

General—(Same as for Specification No. 602 opposite.)

Roofing—Lay four plies of the 15-lb. tar-saturated roofing felt, lapping each sheet 24½" over the preceding one. These felts shall be cemented to the roof by path-moppings of the pitch, such moppings to be run parallel to the incline, to be not less than 12" nor more than 18" wide, the distance between to be not more than twice the width of such moppings. These felts shall also be cemented to each other continuously by mopping under each with the pitch to a

width of 18", starting 2" from the exposed edge. If roof construction permits, nail each sheet at 12" centers, 10" from the back edge.

With nailing strips provided as required, nail each sheet at each nailing strip with two nails spaced 8" and 10" respectively from the back edge.

Over the entire surface mop a uniform coating of the asphalt and embed therein, while hot, not less than 250 lbs. of slag for each 100 sq. ft. of roof surface.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

#### GUARANTEE

(Same as for Specification No. 602 on opposite page, except change to "Ten-Year".)

\*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

SPECIFICATION No. 703

FELTS: (Change name of felt to "J-M Bonded Tar Saturated Rag Felt 15 lb.")

## JOHNS-MANVILLE

## 20 YEAR BUILT-UP ROOF

### SLAG OR GRAVEL SURFACED— PITCH (TAR)— ASBESTOS FELTS\*

OVER POURED CONCRETE OR  
POURED GYPSUM DECKS

INCLINES LESS THAN ¼ IN. PER FT.  
SPECIFICATION No. 613\*

#### BILL OF MATERIALS PER 100 SQ. FT.

*FELTS: 4 layers of J-M Tar-Saturated Asbestos Roofing Felt 15-lb. (16¼ lb. per 108 sq. ft.)	65 lb.
PITCH: J-M Bonded Roofing Pitch	175 lb.
SURFACING: Gravel	400 lb.
or Slag	300 lb.

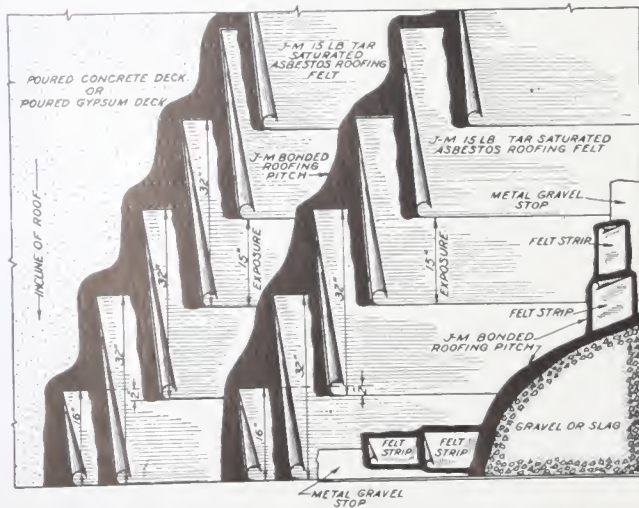
#### ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound, and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

#### INSTALLATION

General—All roofing felts shall be turned up 2" on all vertical masonry surfaces and 4" on all vertical wood surfaces without being cemented thereto. All nails shall be driven through flat metal disks.



Roofing—Lay two plies of the 15-lb. tar-saturated felt, lapping each sheet 17" over the preceding one, mopping the full width under each with the pitch. Over these felts, lay two additional plies of the 15-lb. tar-saturated roofing felt, lapping each sheet 17" over the preceding one, mopping the full width under each with the pitch.

Over the entire surface pour a uniform coating of the pitch and embed therein, while hot, not less than 400 lbs. of gravel or 300 lbs. of slag for each 100 sq. ft. of roof surface.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following:)

#### GUARANTEE

(Same as for specification No. 602, on opposite page.)

\*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

SPECIFICATION No. 713

FELTS: (Change name of felt to "J-M Bonded Tar Saturated Rag Felt 15 lb.")

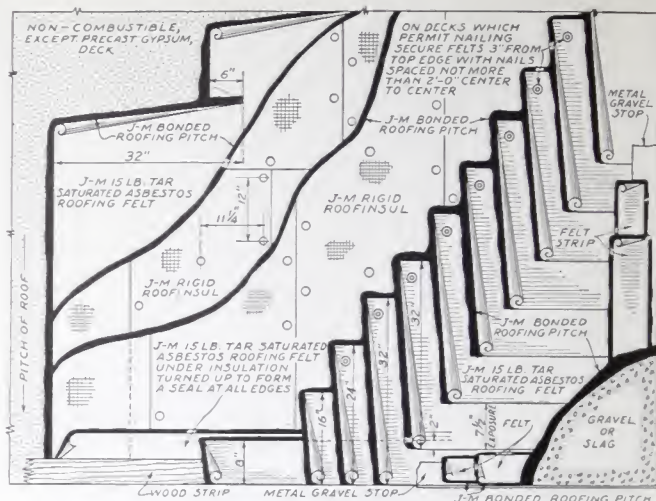
## JOHNS-MANVILLE 20 YEAR BUILT-UP ROOF

### SLAG OR GRAVEL SURFACED— PITCH (TAR)— ASBESTOS FELTS\*

OVER INSULATION  
ON POURED CONCRETE DECKS  
INCLINES 1/4 IN. TO 1 IN. PER FT.

ON POURED GYPSUM DECKS  
INCLINES 1/4 IN. TO 2 INS. PER FT.

### SPECIFICATION NO. 607\*



#### BILL OF MATERIALS PER 100 SQ. FT.

*FELTS: (Under Insulation) 1 layer of J-M Tar-Saturated Asbestos Felt 15-lb. (16 1/4 lb. per 108 sq. ft.)	16 1/4 lb.
*FELTS: (In Built-Up Roof) 4 layers of J-M Tar-Saturated Asbestos Felt 15-lb. (16 1/4 lb. per 108 sq. ft.)	65 lb.
PITCH: (Under Insulation) J-M Bonded Roofing Pitch	30 lb.
PITCH: (For Built-Up Roof) J-M Bonded Roofing Pitch	175 lb.
INSULATION: J-M Rigid Roofinsul (0.8 lb. per sq. ft. 1/2 inch thick) (for each layer of insulation)	100 sq. ft.
SURFACING: Gravel	400 lb.
or Slag	300 lb.

#### ROOF DECK

(a) Roof construction, including cants, coves or fillets, shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound, and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

#### INSTALLATION

General—All felts applied over the insulation shall be turned up 2" on all vertical masonry surfaces and 4" on all vertical wood surfaces without being cemented thereto. All nails shall be driven through flat metal disks.

Felt Under Insulation—Lay one ply of the 15-lb. tar-saturated felt, lapping the sheets 6", mopping the full width under each with the pitch. This felt shall be turned up on, but not cemented to, all vertical surfaces to a height 6" greater than the thickness of the insulation and shall overhang all roof edges a similar amount.

Insulation—Lay the Roofinsul with the rough side down and with all end joints broken, mopping the full width under each sheet with the pitch. The edges of the sheets at the joints shall be thoroughly sealed with the pitch. The insulation shall be isolated into areas approximately 50' 0" square by path-strippings of one ply of the 15-lb. tar-saturated felt, mopped the full width with the pitch, to extend not less than 4" over the edge of the insulation in place and not less than 4" under the adjoining insulation to be laid.

If roof construction is of poured gypsum, nail each sheet of the insulation at 12" centers adjacent to the longitudinal edges and staggered through the longitudinal center.

If to be applied in more than one layer, succeeding layers shall be applied and cemented in the same manner as the first layer, the sheets of each layer to break joints with those of the preceding layer with all nailing done through the top layer.

The over-hanging felt at roof edges shall be turned over and mopped solidly to the Roofinsul.

Insulation shall not be left exposed to the weather. No more insulation shall be laid than can be completely covered with the roofing felts on the same day. At the end of the day's work, roofing felts shall be turned down over the exposed edges of the insulation and mopped solidly.

Roofing—Lay four plies of 15-lb. tar-saturated felt, lapping each sheet 24 1/2" over the preceding one, mopping the full width under each with the pitch. If roof construction is of poured gypsum, nail each sheet at 24" centers, 3" from the back edge.

Over the entire surface pour a uniform coating of the pitch and embed therein, while hot, not less than 400 lbs. of gravel or 300 lbs. of slag for each 100 sq. ft. of roof surface.

Not less than 230 lbs. of the pitch shall be used per 100 sq. ft. of completed roof.

Flashing—(Copy from J-M Standard Specification for Flashing, page 33.)

(If a bond is required, add the following.)

#### GUARANTEE

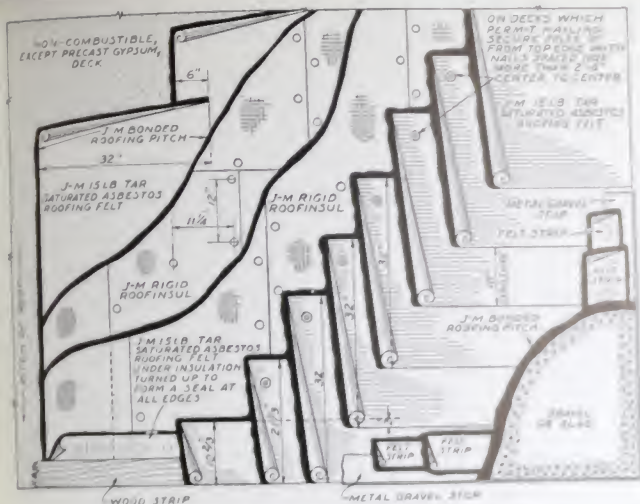
The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Twenty-Year Guaranty Bond.

\*A built-up roof of this same construction is available, differing only in the use of "rag" instead of "asbestos" felt. To specify, make following changes:

#### SPECIFICATION NO. 707

FELTS: (Change name of felt to "J-M Bonded Tar Saturated Rag Felt 15 lb.")

# OVER INSULATION ON NON-COMBUSTIBLE DECKS



## JOHNS-MANVILLE 15 YEAR BUILT-UP ROOF

### SLAG OR GRAVEL SURFACED— PITCH (TAR)— ASBESTOS FELTS\*

OVER INSULATION  
ON POURED CONCRETE DECKS  
INCLINES 1/4 IN. TO 1 IN. PER FT.

ON POURED GYPSUM DECKS  
INCLINES 1/4 IN. TO 2 INS. PER FT.

### SPECIFICATION NO. 609\*

#### BILL OF MATERIALS PER 100 SQ. FT.

*FELT: (Under Insulation) 1 layer of J-M Tar-Saturated Asbestos Roofing Felt 15 lb. (16 1/2 lb. per 100 sq. ft.)	16 1/2 lb.
*FELTS: (In Built-Up Roof) 3 layers of J-M Tar-Saturated Asbestos Roofing Felt 15 lb. (16 1/2 lb. per 100 sq. ft.)	49 lb.
PITCH: (Under Insulation) J-M Bonded Roofing Pitch	100 lb.
PITCH: (For Built-Up Roof) J-M Bonded Roofing Pitch	100 lb.
INSULATION: J-M Rigid Roofinsul (5.8 lb. per sq. ft. 1/2" thick) (for each layer of insulation)	590 lb.
SURFACING: Gravel or Slag	500 lb.

#### ROOF DECK

(Same as for Specification No. 607 opposite.)

#### INSTALLATION

General—(Same as for Specification No. 607 opposite.)

Felt Under Insulation—(Same as for Specification No. 607 opposite.)

Insulation—(Same as for Specification No. 607 opposite.)

Roofing—Lay three plies of the 15-lb. tar-saturated roofing felt,

lapping each sheet 21" over the preceding one, stopping the full width under eave with the pitch. If roof construction is of poured gypsum, seal each sheet at 24" centers, 3" from the back edge.

Over the entire surface pour a uniform coating of the pitch and rubbed flint, white hot, not less than 200 lbs. of slag for each 100 sq. ft. of roof surface.

Flashing—(Copy from J-M Standard Specifications for Flashing, Page 15.)  
(If a bond is required, add the following:)

#### GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Factory Test Company Bond.

\*A built-up roof of this same construction is available, differing only in the use of "rig" instead of "asbestos" felt. To specify, make following changes:

#### SPECIFICATION NO. 609

FELTS: (Change name of felt to "J-M Bonded Tar Saturated" Bag Felt 15 lb.)

## 10 YEAR BUILT-UP ROOF

### SLAG SURFACED • PITCH (TAR) • ASBESTOS FELTS\*

OVER INSULATION ON POURED CONCRETE DECKS • INCLINES 1 IN. TO 6 INS. PER FT.

ON POURED GYPSUM DECKS • INCLINES 2 INS. TO 6 INS. PER FT. SPECIFICATION NO. 611\*

#### BILL OF MATERIALS PER 100 SQ. FT.

*FELT: (Under Insulation) 1 layer of J-M Tar-Saturated Asbestos Roofing Felt 15 lb. (16 1/2 lb. per 100 sq. ft.)	16 1/2 lb.
*FELTS: (In Built-Up Roof) 4 layers of J-M Tar-Saturated Asbestos Roofing Felt 15 lb. (16 1/2 lb. per 100 sq. ft.)	67 lb.
PITCH: (Under Insulation) J-M Bonded Roofing Pitch	100 lb.
PITCH: (For Built-Up Roofs) J-M Bonded Roofing Pitch	100 lb.
ASPHALT: (For top surfacing to receive slag) (J-M Bonded roofing Asphalt)	85 lb.
INSULATION: J-M Rigid Roofinsul (5.8 lb. per sq. ft. 1/2" thick) (for each layer of insulation)	590 lb.
SURFACING: Slag	270 lb.

#### ROOF DECK

(Same as for Specification No. 607 opposite.)

#### INSTALLATION

General—(Same as for Specification No. 607 opposite.)

Felt Under Insulation—(Same as for Specification No. 607 opposite.)

Insulation—(Same as for Specification No. 607 opposite.)

Roofing—Lay four plies of the 15-lb. tar-saturated roofing felt,

lapping each sheet 24 1/2" over the preceding one, stopping under eave with the pitch at a width of 1/2" starting 1" from the exposed edge.

When roofing slope provided is required, seal each sheet at each narrow strip with two seals spaced 1" and 19" respectively from the back edge.

Over the entire surface pour a uniform coating of the asphalt and rubbed flint, white hot, not less than 200 lbs. of slag for each 100 sq. ft. of roof surface.

Flashing—(Copy from J-M Standard Specifications for Flashing, Page 15.)  
(If a bond is required, add the following:)

#### GUARANTEE

(Same as for Specification No. 609 above, except change to "Ten-Year".)

\*A built-up roof of this same construction is available, differing only in the use of "rig" instead of "asbestos" felt. To specify, make following changes:

#### SPECIFICATION NO. 611

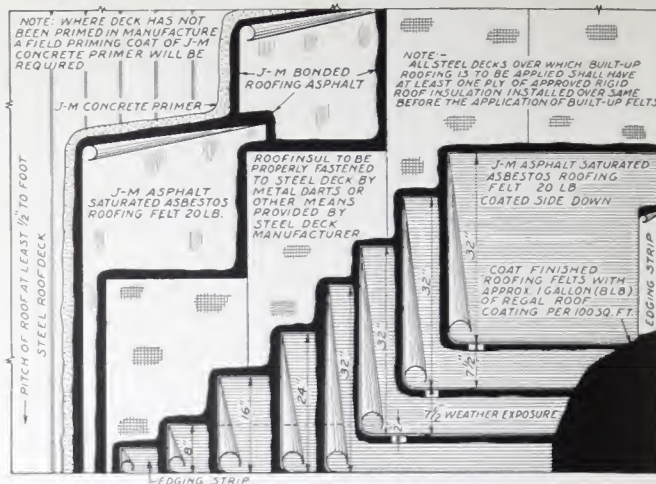
FELTS: (Change name of felt to "J-M Bonded Tar Saturated" Bag Felt 15 lb.)

# J-M STANDARD BUILT-UP ROOF SPECIFICATIONS

## JOHNS-MANVILLE 20 YEAR BUILT-UP ROOF

### SMOOTH SURFACED— ASPHALT— ASBESTOS FELTS OVER INSULATION ON STEEL DECKS

### INCLINES $\frac{1}{2}$ IN. TO 9 INS. PER FT. SPECIFICATION NO. 108



#### BILL OF MATERIALS PER 100 SQ. FT.

FELTS: 4 layers of J-M Asphalt-Saturated Asbestos Roofing Felt 20-lb.	80 lb.
(An additional ply of 20-lb. asbestos felt is specified in Specification No. 502 for application under the insulation)	
PRIMER: J-M Concrete Primer (8 lb. per gal.) (unless steel deck has been shop-coated)	1 gal.
ASPHALT: J-M Bonded Roofing Asphalt:	
For mopping Built-Up Roofing	120 lb.
For mopping Insulation to deck	approx. 40 lb.
For mopping each additional ply of Insulation	30 lb.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

#### ROOF DECK

(a) Roof construction, including cants, coves or fillets shall be properly graded to gutters and roof drains, leaving all surfaces smooth, clean, sound, and dry, in satisfactory condition to receive the roofing.

(b) Nailing strips shall be furnished by others, as required, embedded in the wall structure, to which to secure the flashing.

#### INSTALLATION

General—If the pitch of the roof is  $\frac{3}{4}$  inch to the foot or less, the felts shall be laid at right angles to the pitch. If the pitch of the roof is over  $\frac{3}{4}$  inch to the foot, the felts shall be laid parallel to the pitch.

## 15 YEAR BUILT-UP ROOF SMOOTH SURFACED • ASPHALT • ASBESTOS FELTS • OVER INSULATION ON STEEL DECKS • INCLINES $\frac{1}{2}$ IN. TO 9 INS. PER FT. • SPECIFICATION NO. 109

#### BILL OF MATERIALS PER 100 SQ. FT.

FELTS: 3 layers of J-M Asphalt-Saturated Asbestos Roofing Felt 20-lb.	60 lb.
(An additional ply of 20-lb. asbestos felt is specified in Specification No. 402 for application under the insulation)	
PRIMER: J-M Concrete Primer (8 lb. per gal.) (unless steel deck has been shop-coated)	1 gal.
ASPHALT: J-M Bonded Roofing Asphalt:	
For mopping Built-Up Roofing	60 lb.
For mopping Insulation to deck	30 lb.
For mopping each additional ply of Insulation	30 lb.
ROOF COATING: J-M Regal Roof Coating (Black) (8 lb. per gal.)	1 gal.

#### ROOF DECK

(Same as for Specification No. 108 above.)

The roof felts shall be turned up 2" on all vertical surfaces without being cemented thereto.

Insulation—(Copy from J-M Standard Specification No. 502, page 32.)

Roofing—Lay four plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet  $24\frac{1}{2}$ " over the preceding one, mopping the full width under each with the asphalt or, if job conditions make it desirable to apply the roofing in two operations, lay two plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 17" over the preceding one, mopping the full width under each with the asphalt. Over these felts, lay two additional plies, applied in the same manner as the first two. Coat the entire surface with the roof coating.

Flashing—(Copy from J-M Standard Specifications for Flashing, page 33.)

(If a bond is required, add the following:)

#### GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Twenty-Year Guaranty Bond.

#### INSTALLATION

General—(Same as for Specification No. 108 above.)

Insulation—(Copy from J-M Standard Specification No. 502, page 32.)

Roofing—Lay three plies of the 20-lb. asbestos felt, with the coated side down, lapping each sheet 22" over the preceding one, mopping the full width under each with the asphalt. Coat the entire surface with the roof coating.

Flashing—(Copy from J-M Standard Specifications for Flashing, page 33.)

(If a bond is required, add the following:)

#### GUARANTEE

The work shall be done by a roofing contractor approved by the manufacturer. The roofing contractor shall furnish a Johns-Manville Fifteen-Year Guaranty Bond.

# PROTECTING INSULATED ROOFS AGAINST HUMIDITY

For many years it has been generally recognized that wherever humid conditions may be encountered, it is essential that roof insulation be protected on the underside against the absorption of moisture. Specifications of architects and roofing manufacturers have, therefore, called for a membrane waterproofing course under the insulation wherever it was known at the time the roof was designed that the insulation would be subjected to such conditions.

But there are occasions when, after a relatively few years, there is a change in the use to which a building is put. From an operation not in the least humid, the condition may change almost overnight into one which exposes the insulation to severe moisture conditions.

All types of roof insulation will absorb moisture. The very factor that makes the material effective as an insulation — porosity — is, of course, responsible for its ready absorption of moisture. When insulation on a roof becomes water-soaked, the results are:

- (A) A serious reduction in insulating efficiency.
- (B) Destruction of bond between insulation and roofing felts.
- (C) Disintegration of the insulating material.
- (D) Almost certain damage to the roof deck itself.
- (E) Possible damage to the building contents.
- (F) An expensive re-roofing and re-insulation job.

All Johns-Manville Roof Insulation Specifications call for the application of a layer of roofing felt under the insulation.

## JOHNS-MANVILLE ROOF INSULATION J-M RIGID ROOFINSUL OVER WOOD SHEATHING TO BE OVERLAID WITH A J-M ASPHALT BUILT-UP ROOF SPECIFICATION No. 500

### BILL OF MATERIALS PER 100 SQ. FT.

FELT: 1 layer of J-M Asphalt-Saturated Asbestos Roofing Felt 20-lb. (under insulation) .....	20 lb.
INSULATION: J-M Rigid Roofinsul (0.8 lb. per sq. ft., 1/2" thick) (for each ply of insulation) .....	60 lb.
ASPHALT: J-M Bonded Roofing Asphalt—mopping per ply of insulation .....	40 lb.

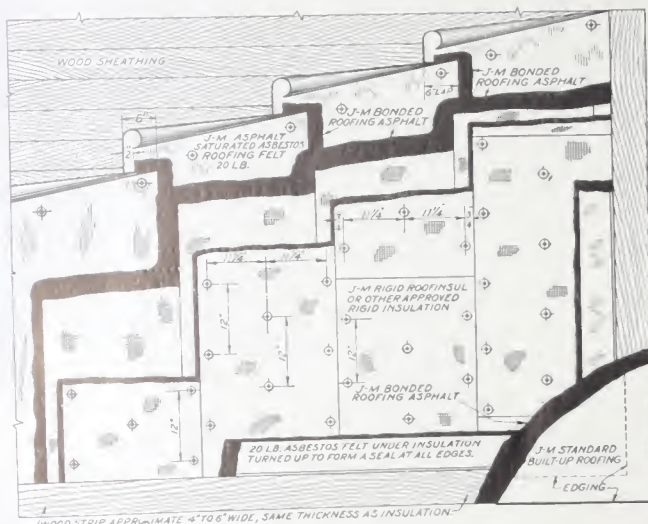
### ROOF DECK

As J-M Rigid Roofinsul (roof insulation) requires, and is designed to receive, built-up roofing directly over it, the following specification has been prepared to be appended to certain Standard Specifications for J-M Asphalt Built-Up Roofs. Such roofs, designed particularly for application over approved rigid insulations over wood sheathing, are designated as Standard Specification Nos. 104 and 106. The roof deck, before being considered satisfactory to receive the insulation, shall be in the condition outlined in the roof specification.

### INSULATION

(a) Lay one ply of the 20-lb. asbestos felt, lapping the sheets 6", mopping in the laps with the asphalt and nailing sufficiently to hold in place. This felt shall be turned up on, but not cemented to, all vertical surfaces to a height 6" greater than the thickness of the insulation and shall overhang all roof edges a similar amount.

(b) Lay the Roofinsul with the rough side down and with all end joints broken, mopping the full width under each sheet with the



asphalt. The edges of the sheets at the joints shall be thoroughly sealed with the asphalt.

(c) The insulation shall be isolated into areas approximately 30 ft. square by path-strippings of one ply of the 20-lb. asbestos felt, mopped the full width with the asphalt, to extend not less than 4" over the edge of the insulation in place and not less than 4" under the adjoining insulation to be laid.

### NAILING

Each sheet of the insulation shall be nailed at 12" centers adjacent to the longitudinal edges and staggered through the longitudinal center. If it be applied in more than one layer, succeeding layers shall be applied in the same manner as the first layer, the sheets of each layer to break joints with those of the preceding layer with all nailing done through the top layer.

### SEALING

The upturned felt at vertical surfaces and roof edges shall be turned down and mopped solidly to the Roofinsul.

### PROTECTION

Insulation shall not be left exposed to the weather. No more insulation shall be laid than can be completely covered with the roofing felts on the same day. At the end of the day's work, roofing felts shall be turned down over the exposed edges of insulation and mopped solidly.

## JOHNS-MANVILLE ROOF INSULATION

### J-M RIGID ROOFINSUL ON NON-COMBUSTIBLE DECKS

TO BE OVERLAID  
WITH A J-M ASPHALT  
BUILT-UP ROOF

### SPECIFICATION No. 501

#### BILL OF MATERIALS PER 100 SQ. FT.

FELT: 1 layer of J-M Asphalt-Saturated Asbestos Roofing Felt 20-lb.	20 lb.
INSULATION: J-M Rigid Roofinsul (0.8 lb. per sq. ft., 1/2" thick) (for each ply of insulation)	80 lb.
PRIMER: J-M Concrete Primer (8 lb. per gal.):	
Over Concrete	1 gal.
Over Gypsum	1 1/2 to 2 gal.
ASPHALT: J-M Bonded Roofing Asphalt—mopping per ply of insulation	30 lb.

#### ROOF DECK

(Same as for Specification No. 500, on previous page, except change second sentence to read, "... insulations over non-combustible decks, are designated as Standard Specification Nos. 105 and 107.")

#### INSULATION

(a) Coat all surfaces which are to receive the insulation with the asphalt primer and allow to dry.

### J-M RIGID ROOFINSUL OVER STEEL DECKS • MINIMUM PITCH 1/2 IN. PER FT. TO BE OVERLAID WITH A J-M ASPHALT BUILT-UP ROOF • SPECIFICATION No. 502

#### BILL OF MATERIALS PER 100 SQ. FT.

FELT: 1 layer of J-M Asphalt-Saturated Asbestos Roofing Felt 20-lb. (under insulation over steel deck)	20 lb.
INSULATION: J-M Rigid Roofinsul (0.8 lb. per sq. ft., 1/2" thick) (for each ply of insulation)	80 lb.
PRIMER: J-M Concrete Primer (8 lb. per gal.) (unless steel deck has been shop-coated)	1 gal.
ASPHALT: J-M Bonded Roofing Asphalt—mopping per ply of insulation	30 lb.

#### ROOF DECK

(Same as for Specification No. 500, on previous page, except change second sentence to read, "... insulations over steel decks, are designated as Standard Specification Nos. 108 and 109.")

#### INSULATION

(a) If the steel deck has not been shop-coated with asphalt paint, or if such coating is incomplete or has been damaged, the entire deck or such uncoated areas shall be painted with the asphalt primer and allowed to dry.

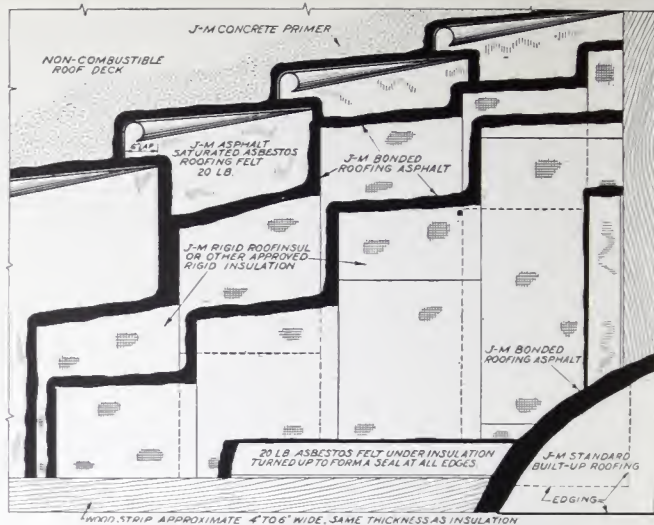
(b) (Same as paragraph (b) for Specification No. 501.)

(c) (Same as paragraph (b) for Specification No. 500.)

(d) (Same as paragraph (c) for Specification No. 500.)

#### SECURING OF INSULATION

If the pitch of the roof deck is 3" per foot or greater, the insulation shall be secured by means of steel darts or other approved device. (Follow with the second sentence under "Nailing" in Specification 500, changing word "nailing" to "fastening.")



(b) Lay one ply of the 20-lb. asbestos felt, lapping the sheets 6", mopping the full width under each with the asphalt. This felt shall be turned up on ... (Balance, same as (a) for Specification No. 500.)

(c) (Same as paragraph (b) of Specification No. 500.)

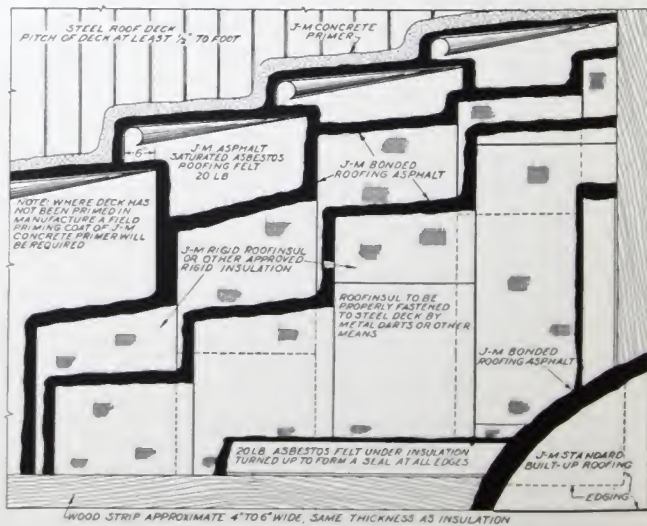
(d) (Same as paragraph (c) of Specification No. 500.)

#### NAILING

If roof construction permits, nail each sheet at 12" centers adjacent to the longitudinal edges and staggered through the longitudinal center. With nailing strips provided as required, each sheet shall be nailed at each strip at 12" centers.

#### SEALING AND PROTECTION

(Same as for Specification No. 500, on previous page.)



#### SEALING AND PROTECTION

(Same as for Specification No. 500, on previous page.)

## JOHNS-MANVILLE

### ASBESTILE FLASHING SYSTEM—10 YEAR BOND

Johns-Manville Flashing is constructed of the same basic materials as Johns-Manville Built-Up Roofs—*asbestos felts*, asphalt and Asbestile, a plastic asbestos-asphalt composition, being the main component parts. It may be installed to cover completely the top and inside face of parapet walls, to extend through walls, or to extend not less than 8" high on the inside face only. J-M Flashing may also be used with a sheet metal cap flashing built into the walls, or it may be used in conjunction with raggle blocks.

As Johns-Manville Flashing is used only in connection with Johns-Manville Built-Up Roofing, the following specification has been prepared to be appended to the Standard Specifications for such Built-Up Roofs.

## BASE FLASHING

Lay one thickness of the 15-lb. or 20-lb. roofing felt, to extend not less than 6" high on the vertical surface to be flashed, and not less than 4" on the roof, lapping the sheets 3", mopping the full width under each with the asphalt, or, if applied with roofs employing pitch, either such pitch or asphalt may be used.

A base flashing composed of J-M Asbestos Base Flashing Material shall be applied directly over and entirely covering the 15-lb. or 20-lb. roofing felt, cemented to it with the asphalt or pitch.

The base flashing shall be nailed, adjacent to its upper and end edges, with large head nails spaced at 8" centers driven into the brick joints or the nailing strip.

The edge of the base flashing on the roof shall be covered with a 4" wide strip of 15-lb. asbestos felt, embedded in and coated over with asphalt or, if applied in connection with roofs employing pitch,

such pitch shall be used.

The end joints shall be covered with Asbestile, as specified under "Cap Flashing."

On skylight curbs, etc., the flashing shall extend full height and turn over on top the full width of the curb.

If no nailing facilities have been provided for securing the upper edge of the base flashing, a five course cap and base flashing, will be acceptable, constructed of alternating layers of Asbestile and 15-lb. asbestos felt. Such flashing shall be applied in a manner similar to that specified below for the application of Cap Flashing to Full Height of Wall, repeating the operations described to provide three layers of Asbestile and two layers of felt. Such flashing shall extend on the vertical surfaces and on the roof the same distances as specified for the flashing method it displaces.

## CAP FLASHING

**WHEN J-M FLASHING IS SPECIFIED TO BE NOT LESS THAN 8 INS. HIGH OR WHEN SHEET METAL CAP FLASHING IS TO BE USED WITH J-M FLASHING** (See drawings in right-hand column, next page.)

A layer of Asbestile, approximately 1/8" thick and not less than 5" wide, shall be troweled in place to cover the nail heads, the upper edge of the base flashing and the adjoining surface of the wall. A strip of 15-lb. asphalt saturated asbestos felt not less than 4" wide shall be embedded therein and a second layer of Asbestile, of the

same thickness as the first, troweled over and finished to a feather edge and to a straight line at the upper and lower edges. If a sheet metal cap flashing is specified, the Asbestile cap flashing shall extend to the point where such metal flashing protrudes from the wall.

End laps in base flashing shall be similarly covered, as specified.

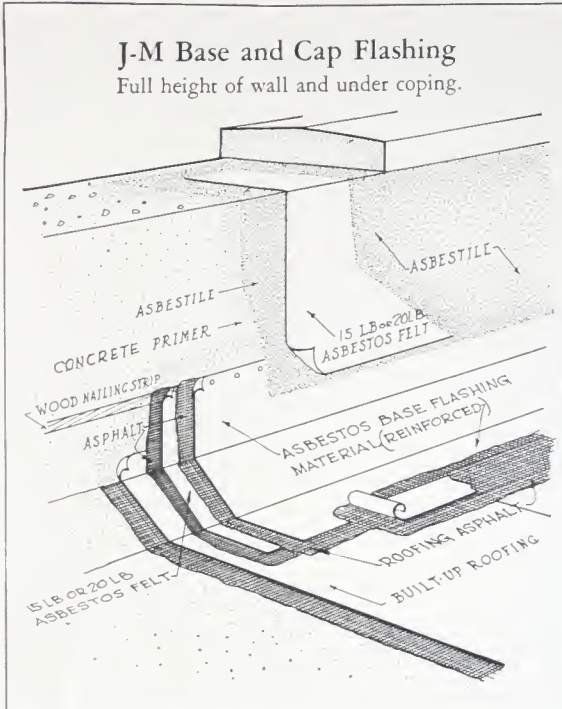
**WHEN J-M FLASHING IS SPECIFIED TO COVER COMPLETELY FULL HEIGHT OF WALL AND TOP OF WALL UNDER COPING TO WITHIN 2 INS. OF OUTSIDE FACE** (See drawing, top of left column, next page.)

A layer of Asbestile, approximately 1/8" thick, shall be troweled in place to cover the nail heads and the upper edge of the base flashing not less than 4" and the entire inside face and top of the wall (under the coping) to within 2" of the outside face. One thickness of

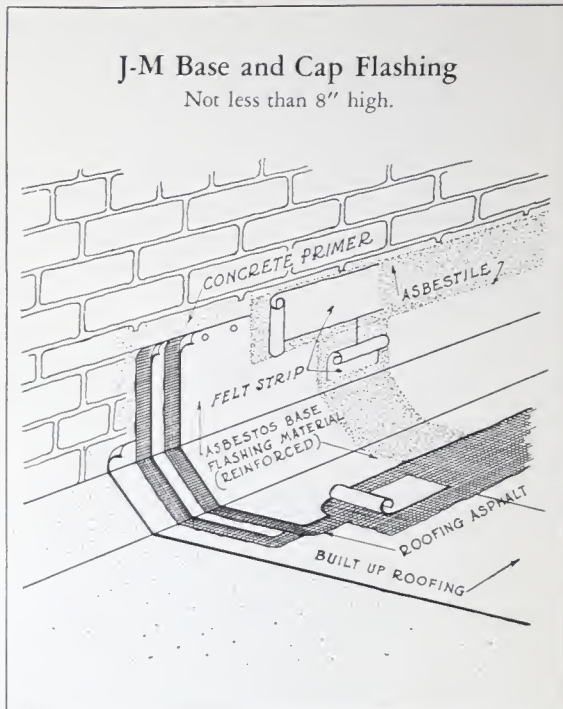
15-lb. asphalt saturated asbestos felt shall be embedded therein, with the sheets lapped 3" and sealed with Asbestile and a second layer of Asbestile, of the same thickness as the first, troweled over and finished to a feather edge and to a straight line at the lower edge.

## DETAILS SHOWING VARIOUS METHODS OF FLASHING FOR JOHNS-MANVILLE BUILT-UP ROOFS

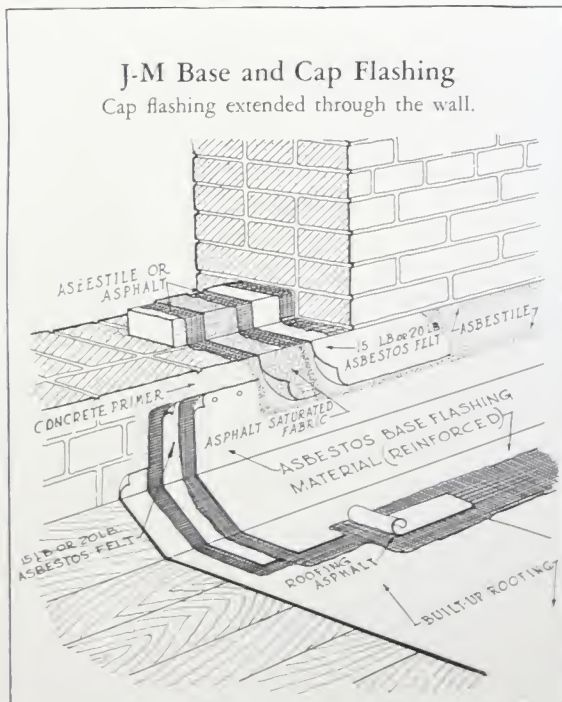
**J-M Base and Cap Flashing**  
Full height of wall and under coping.



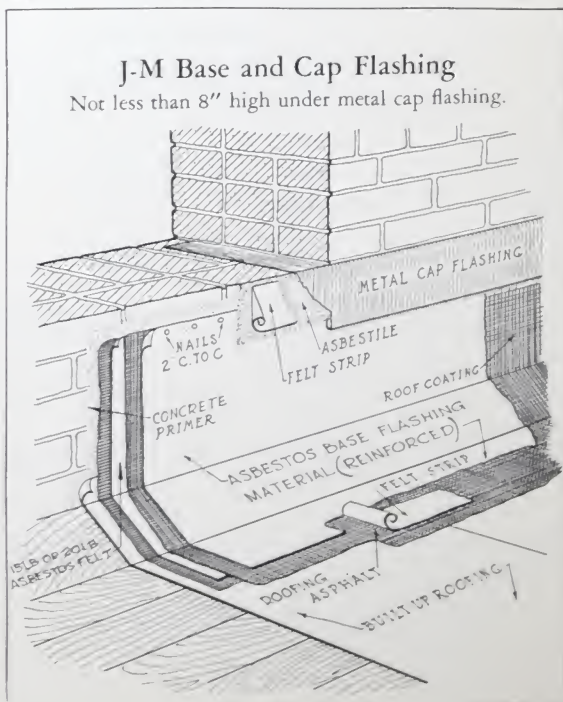
**J-M Base and Cap Flashing**  
Not less than 8" high.



**J-M Base and Cap Flashing**  
Cap flashing extended through the wall.



**J-M Base and Cap Flashing**  
Not less than 8" high under metal cap flashing.





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